Creation Research Society Quarterly

Haec credimus:
For in six days the Lord made heaven and earth, the sea, and
all that in them is, and rested on the seventh. - Exodus 20:11

VOLUME 33 JUNE 1996 NUMBER 1

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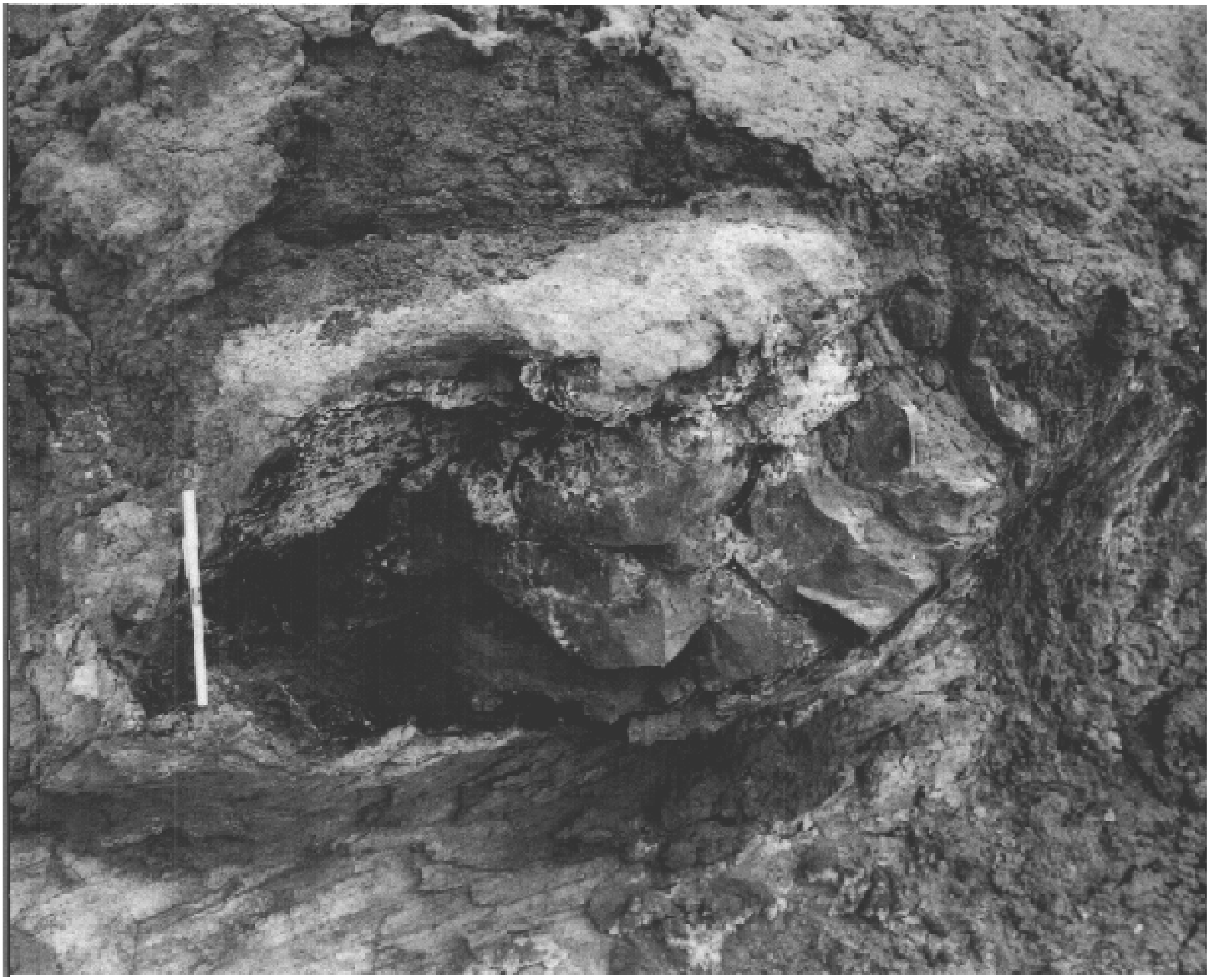

SAME FOSSIL LOG: PARTLY PETRIFIED, PARTLY CHARCOALIFIED

CREATION RESEARCH SOCIETY

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VOLUME 33 JUNE 1996 NUMBER 1

ARTICLES

A Biblical Christian Framework for Earth History Research: Part I-Critique of the Naturalistic-Uniformitarian System . . . John K. Reed 6

Devonian Fish and Amphibians and the Gene-Theme Model. . . Colin Brown 13

The Phantom Bridge Exposed: The Latest Turtle Attack . . . Randall L. Martin 15

Fountains of the Great Deep: The Primary Cause of the Flood . . . Allen Roy 18

Impact Events within the Young-Earth Flood Model . . . Carl R. Froede, Jr. and Don B. DeYoung 23

Slippery Phylogenies: Evolutionary Speculations on the Origin of Frogs . . . Ron Calais and A. W. Mehlert 44

The Geologic Column and the Flood of Genesis . . . Henry M. Morris 49

PANORAMA NOTES

Rapid Canyon Formation through the Cliff Sapping of Unconsolidated Clastic Sediments: Examples from the Southeastern United States . . . Carl R. Froede, Jr. 39

Hairy Pterosaurs *(Sordes pilosus)*- A Progress Report . . . Colin Brown 57

CRSQ Volume 24 . . . Emmett L. Williams 58

Front Cover Photograph

How can a fossil log become partly silicified and partly charcoalified in the same fossil event? Read Photo Essay by Emmett Williams, p. 5, this issue. Photograph by Emmett Williams, Capitol Reef National Park, Utah.

Back Cover Picture

Artist Lisa Pizzarella portrays ***Proganochelys quenstedi,*** a fossil turtle that was already a turtle. See p. 15 for an article about this turtle and others by Randall L. Martin.

DEPARTMENTS

Membership /Subscription Application Form 3

Order Blank for Past Publications 4

Editors' Comments . . . Eugene F. Chaffin and George F. Howe 5

Photo Essay: The Log That Has Been through More Than One Fossilization Mill . . . Emmett L. Williams 5

Letters: ***Matthew Fontaine Maury Not a Young Earth Creationist,*** Robert Lewis Baty, p. 22 ■ ***Reply to Baty Concerning the Views of Matthew Fontaine Maury,*** Trevor J. Major, p. 22 ■ ***Deceitfulness and the Appearance of Age,*** John Baab, p. 34 ■ ***Retired Geologist Believes in Biblical Inerrancy,*** Walter G. Peters, p. 35 ■ ***Life on Other Planets,*** Alan Donnelly, p. 67 ■ ***Christmas Greetings from the Founder,*** Emmett L. Williams, p. 67 ■ ***Comment of "Proposal for a Creationist Timescale" CRSQ* 32:90-97,** Tas Walker, p. 68 ■ ***Catastrophic Shoreline Changes,*** Brian R. Rucker, p. 68

Keyword Index to Volume 32, 1995-96 . . . Eugene F. Chaffin 66

Index of Articles and Panorama Notes, Volume 32, 1995-96 . . . Eugene F. Chaffin 62

Index of Departments, Volume 32, 1995-96 . . . George F. Howe 64

Book Reviews: ***The Fossil Trail: How We Know What We Think We Know about Human Evolution,*** Kevin P. Peil, p. **36** ■ ***Fingerprints of the Gods,*** Kevin P. Peil, p. **36** ■ ***God's Own Scientists: Creationists in a Secular World,*** Wes Harrison, p. 37 ■

Instructions to authors in June 1995 issue.

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CREATION RESEARCH SOCIETY

History The Creation Research Society was organized in 1963, with Dr. Walter E. Lammerts as first president and editor of a quarterly publication. Initially started as an informal committee of 10 scientists, it has grown rapidly, evidently filling a real need for an association devoted to research and publication in the field of scientific creation, with a current membership of over 600 voting members (with graduate degrees in science) and over 1100 non-voting members. The Creation Research Society Quarterly has been gradually enlarged and improved and now is recognized as the outstanding publication in the field.

Activities The society is solely a research and publication society. It does not hold meetings or engage in other promotional activities, and has no affiliation with any other scientific or religious organizations. Its members conduct research on problems related to its purposes, and a research fund is maintained to assist in such projects. Contributions to the research fund for these purposes are tax deductible. The Society operates The Van Andel Research Center in Chino Valley, Arizona.

Membership Voting membership is limited to scientists having at least an earned graduate degree in a natural or applied science. Dues are $22.00 ($27.00 foreign) per year and may be sent to Glen W. Wolfrom, Membership Secretary, P.O. Box 8263, St. Joseph, MO 64508-8263. Sustaining membership for those who do not meet the criteria for voting membership, and yet who subscribe to the statement of belief, is available at $22.00 ($27.00 foreign) per year and includes a subscription to the Quarterlies. All others interested in receiving copies of all these publications may do so at the rate of the subscription price for all issues or one year: $25.00 ($30.00 foreign).

Statement of Belief Members of the Creation Research Society, which include research scientists representing various fields of successful scientific accomplishment, are committed to full belief in the Biblical record of creation and early history, and thus to a concept of dynamic special creation (as opposed to evolution), both of the universe and the earth with its complexity of living forms. We propose to re-evaluate science from this viewpoint, and since 1964 have published a quarterly of research articles in this field. All members of the Society subscribe to the following statement of belief:

1. The Bible is the written Word of God, and because it is inspired throughout, all its assertions are historically and scientifically true in all the original autographs. To the student of nature this means that the account of origins in Genesis is a factual presentation of simple historical truths.

2. All basic types of living things, including humans, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.

3. The Great Flood described in Genesis, commonly referred to as the Noachian Flood, was a historical event worldwide in its extent and effect.

4. We are an organization of Christian men and women of science who accept Jesus Christ as our Lord and Saviour. The account of the special creation of Adam and Eve as one man and woman and their subsequent fall into sin is the basis for our belief in the necessity of a Savior for all people. Therefore, salvation can come only through accepting Jesus Christ as our Savior.

Editors' Comments

We are happy to include, in the first issue of volume 33 of the *Creation Research Society Quarterly,* articles related to the origin of amphibians and turtles. The authors critique the current thinking of paleontologists regarding evolution of frogs from amphibians, amphibians from fish, and turtles from reptiles.

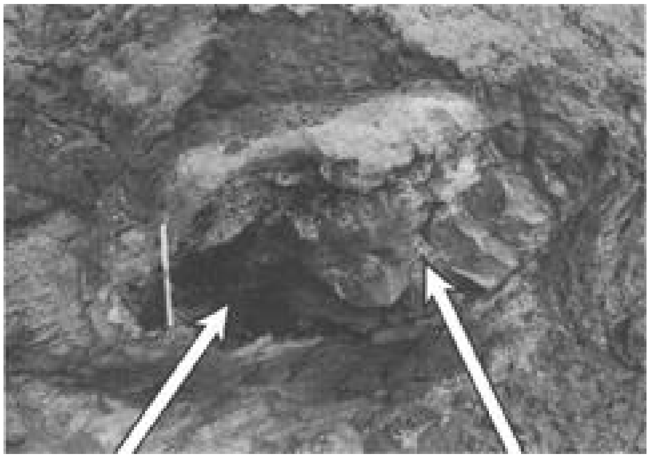
Dr. Henry Morris needs no introduction to creationists, having been one of the major personalities in the modern revival of belief in the accuracy of the creation. Dr. Morris provides, in this issue, some important and thought provoking ideas about where the boundary between Flood rocks and non-Flood rocks might be drawn. Also in this issue there is an article analyzing the term "fountains of the deep" in Scripture. Whether all the theologians agree with the conclusions or not, we think that this article will help to clarify the issues.

In recent years science journals have continually brought up the impact theory for the mass extinction at the Cretaceous-Tertiary boundary. Now we present an interesting article by Don DeYoung and Carl Froede discussing the realities from a creationist viewpoint.

Please notice the special offers on books and back *CRSQ* volumes advertised in this issue, valid until December 31, 1996. We hope readers will take advantage of the savings on these important books. They can help to present the creationist worldview to those who need to hear about it.

Eugene Chaffin
George Howe

PHOTO ESSAY



The Log That Has Been Through More Than One Fossilization "Mill"

A fossil log that is charcoalified on one side and petrified (silicified) on the other side as noted. The six-inch long ballpoint pen was placed on the charcoalified side of the fossil as a scale reference. The charcoalified wood has the appearance of having been "leftover" from a campfire. The fossil wood was located in a bentonite mound below the Eph Hanks tower in Capitol Reef National Park, Utah. The origin of charcoalified and petrified wood from a young earth perspective has been discussed in the Quarterly *(CRSQ* 30:106-111; 169-176).

Charcoalified wood probably has either been burned or exposed to a high temperature and baked, releasing moisture, carbon monoxide, methane, hydrogen and tars (in the temperature range of 280-500°C). Exposure of wood to hot volcanic ash could cause combustion in the presence of oxygen. If the wood is covered rapidly by hot volcanic ash, it could bake (pyrolysis).

Petrified wood must be exposed to sediments containing silicia (silicon dioxide) and water. The wood absorbs silica from the sediments and hardens. The natural process is not well understood, but wood has been petrified rapidly in silicate solutions in the laboratory (in a matter of hours or days). A more complete explanation of the petrifaction process can be found in the Quarterly *(CRSQ* 30:106-111).

The fossil wood pictured in the photograph has a charcoalified portion and a petrified portion. The log was exposed to heat as well as a water-silica solution! Possibly the log was exposed to a blast of hot volcanic ash which caused a part of it to be charcoalified. The other side of the log could have been submerged in shallow water at the edge of a lake which prevented complete charcoalification. Later the log was covered by cool volcanic ash which was high in silica. Rainfall percolating through the silicate sediment, dissolving silica, then depositing SiO_2 as the solution soaked into the wood structure caused it to petrify. Post-Flood volcanic activity in a moist, warm ice age climate would have been ideal for such a scenario. Of course there are other possible conditions related to the Flood that have resulted in the formation of the charcoalified / petrified log. Why not write the editor and offer another possible Flood-related mechanism? May we hear from you.

Emmett L. Williams*

***5093 Williamsport Drive, Norcross, GA 30092.**

Quote

Psalm 96:5

For all the gods of the nations are idols, but the Lord made the heavens.

Holy Bible, New International Version Copyright © 1984, International Bible Society. Used by permission of Zondervan Bible Publishers.

A BIBLICAL CHRISTIAN FRAMEWORK FOR EARTH HISTORY RESEARCH PART I-CRITIQUE OF THE NATURALIST-UNIFORMITARIAN SYSTEM

JOHN K. REED*

Received 25 July 1994; Revised 25 September 1995

Abstract

An honest appraisal of historical geology must recognize that interpretations of earth history include elements other than scientific investigation. These interpretations are more properly evaluated by primary, formal tests for internal consistency between their extrascientific foundational principles (axioms) and conclusions. Failure of these formal tests automatically invalidates any system of interpretation, prior to empirical evidence. Success in passing formal tests does not guarantee success in field interpretation; it only provides the framework within which successful models of earth history may be constructed. The application of this method to the underlying naturalist-uniformitarian paradigm of modern historical geology shows it to be invalid because it fails tests of internal consistency when comparing its conclusions to its axioms in the following areas: the nature of the cosmos, of man, and of history. Thus, a valid model of geologic history cannot be generated within the naturalist-uniformitarian system.

Introduction

Modern historical geology presents an interpretation of earth history that must be replaced if the biblical Christian worldview is to be credible. There are two facets of this task: the refutation of the current dominant system, and the introduction of a theistic alternative that successfully addresses the failures of the present system. Creationists have not yet accomplished this substitution, and cannot do so effectively without demonstrating fundamental metaphysical and epistemological failures of the current system.

The current uniformitarian geologic column (Figure 1) is the framework by which the rock record of earth history is interpreted. For more information on the structure and development of the geologic column, see Froede (1995). Since its inception, it has developed into a complex, seemingly well-integrated theoretical umbrella for modern geologic interpretation. Its successful global application is a compelling argument for inherent organization in the field data, and for the column's ability to integrate and interpret those data. However, this construct has sufficiently severe philosophical deficiencies that require its rejection, rather than merely its revision (which would be the case if the deficiencies were scientific). The column is popular in spite of its flaws chiefly due to its practical insignificance in the daily business of most earth scientists, the lack of thought *about* science by scientists, and the convenience for interpretation derived from its monolithic dominance in modern geology.

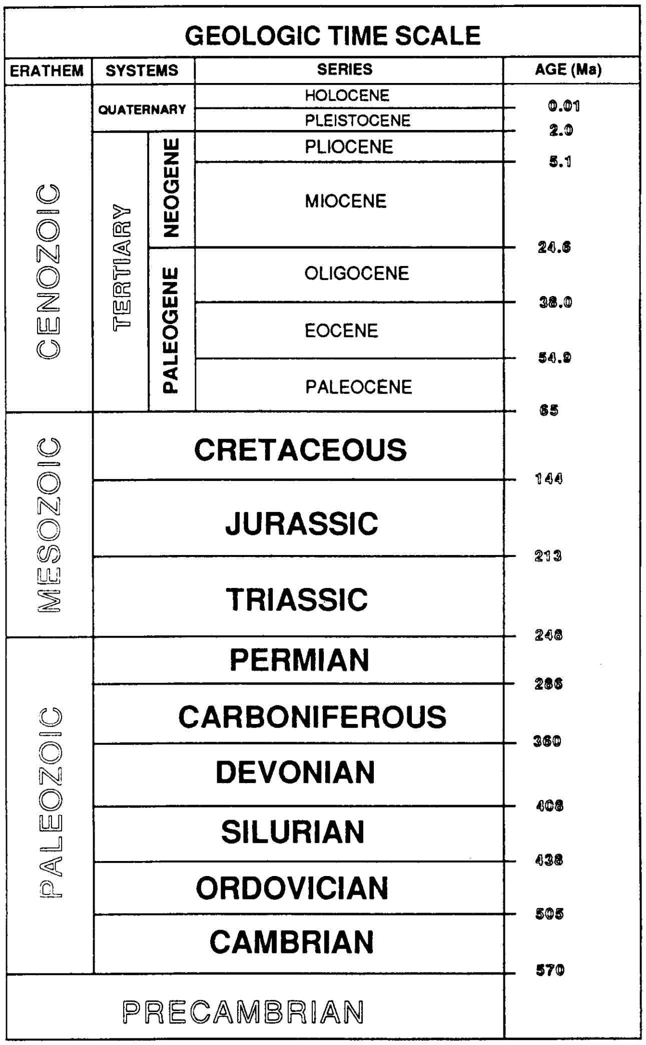


Figure 1. Simplified geologic column after Lemon (1990).

The most severe deficiency in the geologic column is its inextricable linkage to the naturalist-uniformitarian system, and its resulting inability to define and defend its axioms on a metaphysical level. This is partly due to, and compounded by, the impossibility of making clear distinctions between scientific models, methodological frameworks, and metaphysical systems within naturalism-uniformitarianism (system is used throughout this paper synonymously with "worldview" as in Sire (1976, p. 17)). Each of these components should be integral, but with distinctions between them that would allow retroactive revision and potential rejection of field models apart from the system itself. Since the geologic column, uniformitarianism, and naturalism are tightly welded together by the application of a reductionist, scientistic epistemology, failure of any part causes the failure of the integral whole (Figure 2). Although the geologic column appears to be useful in

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*John K. Reed, Ph.D., 915 Hunting Horn Way, Evans, GA 30809.

correlating field data, if the axioms of naturalism-uniformitarianism are internally inconsistent, or contradict the analytic process or valid conclusions of the system, then by definition it is formally flawed, and field evidence is irrelevant to validity. The problem facing the geologic column, briefly stated, is "If you cannot possibly be right, why bother gathering empirical data?" The naturalist-uniformitarian system must meet both formal and empirical tests; if it fails more fundamental formal tests, then it must be modified or rejected apart from anecdotal evidence.

The same criteria for success or failure must apply to any alternative model. Any proposal by creationists must include the definition and defense of the axioms of the biblical Christian system, develop a sound methodological framework, and constrain particular models within that context. These models should then demonstrate predictive capacity in the field, and be subject to empirical revision and potential rejection within the framework. The methodological framework should allow separation between the models, the system, and the framework on a working level, allowing scientific revision within the model itself without forcing immediate, complementary revision in the supporting extrascientific system. In the early history of modern science, an explicit separation might not have been necessary, since the supporting worldview was predominantly Christian, and the concepts fundamental to understanding the limits of scientific analysis were widely shared. Significant secularization of culture during recent centuries has eliminated that monolithic context, and only the explicit statement of foundational assumptions can save any modern theistic alternative from the same formal pitfalls inherent to any uniformitarian 'model.'

Since this consensus has been lost, a preliminary foundation and method for generating models of earth history will be presented in a series of related papers. This series is not intended as a complete philosophical critique of the uniformitarian geologic column, nor is it a complete philosophical apology of any potential creationist alternative. Rather, it is an attempt to broadly outline issues that would be relevant in such works, and to provide a basic rationale for the development of a creationist correlation chart for the rock record and of creationist models of geologic earth history.

The Column is the System

The geologic column is an integral part of a naturalist worldview (reality = physical processes operating on matter in a closed system) (Sire, 1976, p. 61). The connecting link between naturalism and uniformitarianism is evolution: Evolution is the modern naturalistic explanation for the existence and character of phenomena, and is also the basis for interpreting the observed rock record into the geologic column. A circular relationship has been recognized between these facets of naturalism (Morris, 1985, p. 136). The circle is completed by the geologic column providing key "evidence" for historical evolution, an for evolution providing the "scientific" basis for naturalism. The resulting tautology has been noted, and beneath the tautology lies a more basic relationship that is destructive of the scientific method itself. This relationship is one that does not allow separation between the extrascientific parent system and derivative scientific models (see Figure 2). Thus, these models are not truly open to revision and rejection by empirical investigation. Since the naturalist system adopts a reductionist epistemology of scientism, in which science displaces theology and philosophy as the valid path to true knowledge (Schlossberg, 1983, p. 142), there is no possibility of any neutral appraisal of a distinct hypothetical scientific model; error in the geologic model would force revision of the entire system. Denial of extrascientific aspects of the model eliminates the possibility of theological/philosophical criticism of those aspects of the system. Thus, adherents of the naturalist system have limited the potential for scientific progress in earth history studies. This complex relationship between various facets of naturalism is sufficient to demonstrate the extrascientific nature of its component parts. And yet, it is the carefully arranged facade of scientific objectivity that is one of the greatest apologetic assets of the naturalist system.

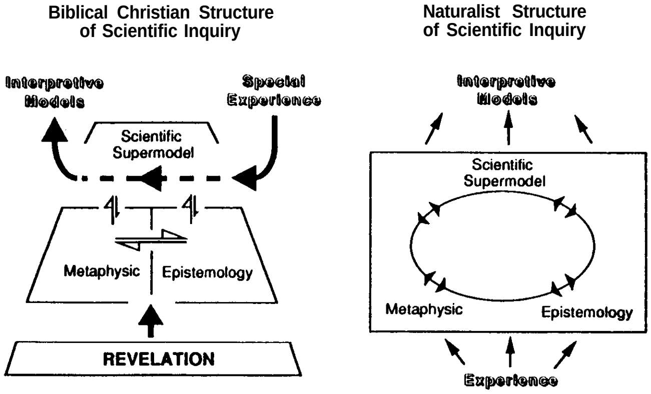

Figure 2. Comparative diagram of metaphysical-epistemological-scientific relationships for the biblical Christian and naturalist worldviews as they relate to the generation and development of geologic models. In the biblical Christian system, there is an orderly internal structure (much simplified here) that acts as a basis for regulating the flow of data and structuring interpretation. The naturalist system not having a similar internal structure allows more chaotic data flow through the system. The biblical Christian system anchors experience to absolute truth via revelation thus allowing for the distinction between special experience and experience in general (Adler, 1965); the naturalist-uniformitarian must utilize experience indiscriminately in the hope that truth can be achieved by accretion of sufficient quantities of data.

In geology, the application of this system is monolithic. All current geologic interpretation is predicated on applying the geologic column, and research is always performed in reference to it. A cursory reading of contemporary geologic literature will quickly demonstrate the ubiquitous nature of the column, and will also demonstrate a lack of retroactive criticism of the 'model' in data analysis, even where observations are difficult to integrate into the conventional model. One sure mark of the extrascientific nature of the current model is the paucity of any research directed at revision of the model itself.

Within the uniformitarian camp, and also in the debate between evolutionists and creationists, the fundamental nature of the geologic column is seldom seriously questioned. Theists, especially nonscientists, have often avoided the issue by downplaying the importance of the geologic column. This is done by de-emphasizing the issue of time, using a temporally "condensed" version of the geologic column, or simply ignoring it as a relevant issue.

The lack of systematic geologic interpretation in creationist literature renders most analyses of the column tentative and inconclusive. However, the lack of field investigation need not restrict a critical analysis of the uniformitarian geologic column, since it is not merely an empirical model, but instead a comprehensive definition of earth history fundamental to a larger, naturalistic-uniformitarian framework.

The function of the geologic column and its associated timescale demonstrates their extrascientific nature. The column is a frame of reference that integrates phenomena into an orderly historical progression of natural events and processes that are not otherwise easily integrated. These include cosmic and planetary evolution, organic evolution, tectonogenesis, sedimentation, climatic change, etc. (e.g., Haq and Van Eysinga, 1987). Each of these natural processes is integrated into an orderly historical framework in a manner that assigns intangible, orderly historical significance to tangible physical features which have no intrinsic historical significance apart from the interpretation. During the interpretive process, a philosophic view of history (with all of its inherent 'religious' significance) has suddenly been applied comprehensively to field data via a scientific shortcut. For example, a single bone found in outcrop is an entire organism, is an entire species, is part of an evolutionary chain in time, and (through space) is part of a paleoecosystem. The smooth an ordinary manner by which this is accomplished masks the remarkable act that the empirical aspect of this process has become progressively minimal and the final product is largely an artifact of the model itself, which has covertly incorporated weighty extrascientific baggage. Thus, an evaluation of the geologic column must first include a critique of the naturalist-uniformitarian system, by reference to its fundamental extrascientific features, a critique that must be performed prior to any scientific evaluation.

Admittedly, a thorough critique of naturalism is a large task, complicated by frequently hidden extrascientific dimensions which render it largely immune to contradiction *in toto* by observation alone. Many such critiques have been performed over the centuries, but the context of this contribution is modern historical geology. Although historically, almost all science and technology were done using empirical approaches to nature, the philosophic impetus towards naturalistic and historical system building in the nineteenth century led to the popularity of ‘modern’ methods. These methods had in common a scope well outside the limits of natural science, but a cloak of scientific veracity and neutrality that exploited that period’s optimism. The following critique will attempt to pull away that cloak and address the geologic column as an integral part of the naturalist system.

Ground Rules for the Interpretation of Earth History

The first step in such a critique is the recognition that historical analysis is a much larger and more complex question than is commonly presented in geologic interpretations. Key issues to be addressed prior to developing any model are: (1) the severely limited potential for human neutrality in historical analysis; (2) the proper domains and relationships of the various areas of human knowledge; and (3) the criteria for establishing a critical framework within which competing models can be evaluated. In each issue, the biblical Christian system demonstrates a superior basis for performing historical analysis compared to the naturalist-uniformitarian system. Although success or failure of a scientific model cannot conclusively demonstrate success or failure of the parent system and framework, an inverse relationship is true: the failure of a parent at a fundamental level invalidates derivative scientific models.

Any person desiring to perform historical analysis must accept the impossibility of their neutrality. This step is difficult for those trained in the sciences, because the scientific method is designed to maximize objectivity, and methodological objectivity (within a constrained set of limits) is often incorrectly presumed to depend on both the observed situation and the observer, and thus guarantee metaphysical neutrality as well as methodological objectivity. The objectivity built into the scientific method is limited for two important reasons: (1) the scientific method has limited application, and (2) science as a discipline requires supporting assumptions external to the scientific method, and is therefore open to the bias associated with religious or philosophical commitments. Objectivity frequently decreases with increasing bias, and is more difficult in projects such as the interpretation of earth history, where empirical data are sparse, and ideological stakes are large. The ability to recognize subjectivity, and develop methods or identifying and limiting it must be expected in any successful interpretation of earth history. Denial of bias is diagnostic of a flawed system, and any model of earth history from such a system should be partially evaluated in terms of the subjective values and ideological commitments of its proponents. Although unlimited neutrality is impossible, it is also unnecessary to test consistency between baseline assumptions and a model’s conclusions. This leads to a valid formal method of criticism acceptable to any who utilize logical modes of thought.

If a system meets tests of internal consistency, derivative models may be tested by the application of scientific methods of investigation using external, empirical evidence. However, investigations of earth history also include information that cannot be tested by scientific methods. The use of empirical data is not uniquely a function of science, but is also true of other disciplines including history, philosophy, and theology. Scientific investigation is distinguished from philosophical and historical investigation by the distinction between what Adler (1965) terms “special experience” and "common experience." Special experience results from the use of controlled, repeatable techniques; while common experience refers to uncontrolled, everyday events observable by any person. The combination of special and common experience in the investigation of earth history is inevitable, and an emphasis on the integration of disparate methods for the purpose of discovering truth is superior to the naturalist insistence on science alone, on science as defined by positivism, and on the subsequent implication that method is more important than truth.

Religion and the Recognition of Historical Subjectivity

The impossibility of neutral historical analysis is rooted in the deep religious significance of history in the western tradition. Christianity, Islam, and Judaism (and most of their derivative cults) all share a foundation in historical events. The most effective attacks on religious belief in modern times have not been directed at the theological interpretation of certain historical events, but at the factuality of the events themselves. Therefore, the affirmation *or* denial of a given historical event crucial to Christianity must by definition involve religious value. The Genesis account is important to Christian faith; therefore its affirmation or denial has religious significance. In this light, the debate over earth history reveals a religious aspect that debunks the myth of scientific neutrality. Theists commonly recognize and accept the potential subjectivity inherent in the interplay between faith and knowledge. Extensive discussion regarding the relationship between faith and knowledge throughout the history of Christianity is testimony to the development of mechanisms for recognizing and limiting human bias within that system. In this regard, theism is superior to naturalism, because naturalism presumes an objective scientific basis for a 'neutral' system. Its proponents are therefore blind to their own biases, and have developed no comparable mechanisms for accommodating them.

Bias on the part of the naturalist is twofold: Negatively in refuting the historical foundation of opposing theistic religions, and positively by advocating historic events not demonstrable by scientific observation. Evolution is the historical basis for naturalism and although evolutionary events are less specific and personal than biblical events, they represent no less of a religious historical foundation than the Genesis account. Claims that only the Christian position is burdened with religious commitments (the naturalist camp being immune to such difficulties because of their agnostic and scientistic commitments) are spurious; it has become increasingly clear that a commitment to atheism is just as religious a commitment as theism (Morey, 1986) and that claiming scientific objectivity for conclusions derived far outside the limits of science is invalid.

Formal Tests for Historical Analysis

The points of difference between the two systems, theistic and naturalistic, are important, and commonly are the focus of discussion and debate. However, a different perspective that results in the exploration of their common commitments allows a more fundamental critique of naturalism and its model of earth history. For example, both camps share a deep commitment to the significance of history in their "religious" framework. This shared commitment is based upon a biblical perspective on the nature of history (Cullmann, 1964, p. 23). Thus, the naturalist has appropriated a Christian pattern of thought devoid of any non-theistic basis for doing so. This pattern is repeated in other comparisons between the two systems. An examination of common ground between the two systems will highlight tremendous internal conflicts within the naturalist uniformitarian system usually obscured by a cloak of scientific objectivity (and implied neutrality), and will demonstrate the failure by formal tests of the naturalist-uniformitarian system: The same evaluation will support the biblical Christian position, both by eliminating a powerful opponent and by highlighting how the biblical Christian system passes tests failed by naturalism.

Formal tests invalidate the naturalist-uniformitarian system, and simultaneously define a framework for a biblical-Christian alternative. These tests are based on comparison of underlying axioms of these systems with their respective methodologies or conclusions. A key to these tests is the primary role reserved for science in the naturalist system, a role that will be shown to be the source of many of its internal contradictions, since justifying the existence and application of the scientific method is a distinctively Christian task,* and cannot be done by naturalism. Therefore, it will be shown that the biblical Christian framework passes formal tests of internal consistency, but the naturalist-uniformitarian system does not because it must appropriate axioms of biblical Christianity to support conclusions which are in turn offered as a refutation of biblical Christianity.

The formal tests for consistency will be performed in regard to a view of nature, man, and history. It will be shown that the naturalist-uniformitarian system utilizes uniquely biblical assumptions in each of these areas without acknowledgment or justification of how these assumptions can be developed in a non-theistic system.

The "Nature" of Nature

The shift in cosmological perspective that led to the development of modern science is rooted in the development of Christian theology during the late Medieval and Reformation periods. This development was crucial to modern science, and centered on the dominantly Christian interpretation of the cosmos in its relationship to a free, transcendent creator, in contrast to previous cosmological views in which nature subsumed all reality (Glover, 1984). This development allowed a clear break with the cosmological views of nature dominated at that time by, Aristotelian natural philosophy. During Medieval times the contrast between the biblical and Aristotelian frameworks was developed through the Scholastic enterprise, which rigorously evaluated the compatibility of the two systerns. The failure to effectively integrate the two systerns is termed, ". . . the most fruitful, creative failure in the entire history of the human mind." (Glover, 1984, p. 34). The ultimate success of Scholasticism was its development of a new understanding of the cosmos from the rejection of key tenets of Aristotle in favor of biblical revelation.

> No Christian could ultimately escape the implications of the fact that Aristotle's cosmos knew no Jehovah. Christianity taught him to see it as a

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*There is a theoretical possibility that this task could also be performed by other theistic religious (i.e.. Judaism and Islam) that share the Christian commitment to a transcendent creator, however a brief review of the history of science demonstrates that modern science arose under the influence of distinctively Christian intellectual trends that flowered following the Protestant Reformation and the Renaissance.

> divine artifact rather than as a self-contained organism. The universe was subject to God's laws; its regularities and harmonics were . . . a result of providential design. The ultimate mystery resided in God rather than in Nature. . . . The only sort of explanation science could give must be in terms of descriptions of processes, mechanisms, interconnections of parts. Greek animism was dead. . . . The universe of classical physics, in which the only realities were matter and motion, could begin to take shape. (A. R. Hall, The Scientific Revolution, 1500-1800, second edition, as quoted in Glover, (1984, p. 83)

Glover discusses two profound implications of this view. The first is that creation was a free act of God, and not governed by any internal deterministic forces. Therefore, our knowledge of the creation could not be derived from rational principles alone, but only from critical reflection upon observation and revelation. The primacy of empirical observation over rational contemplation, and thus the western empirical tradition, is based firmly on the biblical doctrine of creation. There is no corresponding rationale for an empirical tradition in naturalism. The second implication was the transfer of the source of final cause (purpose) from nature (Aristotelian) to God, and the corresponding restriction of scientific inquiry.*

Any discussion of final cause is a philosophical minefield for the naturalist-uniformitarian system. Its proponents are faced with a profound trilemma: either final cause does not exist, final cause originates outside of nature or final cause originates within nature. If final cause originates outside of nature, then the Christian understanding of the cosmos is essentially correct, and consistency would force a reevaluation of basic naturalist commitments, and the correlative uniformitarian history. If final cause originates within nature, then the emancipation from Aristotelian principles is invalid, and science must be redefined along Aristotelian lines. If final cause does not exist, then nature is irrational, and a pursuit of a scientific understanding of nature is also irrational. Faced with the impossibility of an Aristotelian reincarnation of science, the strength of the religious commitment against Christian theism in the naturalist camp is demonstrated by the increasing popularity of modern irrational mysticism, even among members of the "scientific" community. (See Schlossberg, 1983, pp. 158-176.)

Modern science was born out of a unique understanding of nature as a mechanistic artifact of an intelligent, designing, purposeful, and volitional God (Glover, 1984). The naturalist system denies God, and consequently, this special God-nature relationship. Any concept of nature as ultimate reality reinstates the same cosmological framework that required elimination to enable the birth of modern science. And yet modern naturalism rests on the method of modern western science. In this foundational axiom, the naturalist-uniformitarian system is shown to be internally inconsistent in two important areas. Its proponents cannot demonstrate the basis for a clear distinction between mechanism as a methodology and mechanism as a metaphysic (Glover, 1984) within their system. Also, unless they justify the removal of final cause from nature without eliminating final cause *per se*, they cannot justify their faith in the scientific method of investigation, which is their primary line of defense against competing theistic worldviews. Christian axioms are appropriate to support conclusions that contradict those axioms. Conversely the biblical-Christian framework is shown to be internally consistent, and a superior system for conducting scientific studies in historical analysis.

The Position of Man

The success of modern science thus relies in part on a special biblical understanding of God's relationship to the cosmos. However, that relationship only provides for the intrinsic comprehensibility of nature. Science is a human endeavor and requires beings who can take advantage of the special "openness" of nature. This factor was supplied historically by a special biblical understanding of God's relationship to man. Science is not possible if man is merely a part of the system, and has no transcendent relationship with nature. Man's transcendent relationship to nature is necessary for any potential ability to objectively comprehend nature, and man's relationship to God (who can by definition understand nature) provides a positive basis to exercise that potential. The naturalist's rejection of God disallows a basis for man's transcending nature and for man's ability to comprehend nature. And yet, it is precisely those characteristics that allow man to develop the science which supposedly demonstrates the validity of naturalism.

The naturalist view has an inherent sympathy with the historical thesis that the self-understanding that led to the birth of modern science was primarily a rebirth of classical Greek anthropology. Although this view is common, Renaissance humanism was not primarily a rediscovery of the classical Greek view of man, but rather a uniquely Christian interpretation of man's place in the world (Glover, 1984, p. 51). The primary difference between the classical view of man and the Renaissance view of man reflects the influence of a Christian perspective. Greek man existed in a fixed position in an unchanging cosmos. History was cyclical (Plato is an exception at this point), and of little importance, since man had no impact on the future. If men exceeded their place in nature, they were brought down by fate or the gods. In contrast, the Christian view of man developed in the Renaissance grew from the biblical insight that man was created in the image of God. Since God transcended nature, man did also. Nature was "dead"* and man's

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*Aristotle identified understanding with causal explanation. He employed a fourfold outline for explanation which has since been commonly known as Aristotle's 'four causes.' These include the **material** *(lit.* "the out of which"), **formal** *(lit.* "the what it was to be of a thing"), the **efficient** *(lit.* "the origin of motion"), and the **final** *(lit.* "the on account of which") causes. Each of these causes was inherent in nature. By contrast, modern science reduces scientific explanation to the material cause (i.e., atomic structure) and selected parts of efficient cause (i.e., motion). Final cause (also known as 'teleology') is denied, and therefore considered irrelevant to scientific investigation. Aristotle's description of the four causes can be found in *Physics* II-3, 194b 16 - 195a 2 (McKeon, 1941).

*Nature was dead in the sense that the divine was separated from nature, and mechanistic predictability was possible. There were no longer any sacred spirits in trees, rocks, and streams to alter mechanistic regularity, or to prevent human investigation of that regularity. Historically, this concept became popularized by the analogy of machinery. Whether or not this analogy is complete in all of its aspects remains unanswered.

creative purpose in God's creation dealt not with nature operating on man, but with man operating on nature. Nowhere in the Greek mode of thought was there room for the creation mandate (Genesis 1:28) to subdue and rule the earth. In the biblical mode, man's existence centered not on his relationship with nature, but with God.

A robust biblical Christian view of man as a special creation in God's image developed during the Renaissance (Glover, 1984). The development of science was accelerated by this unique anthropology, which justified man's transcendence to nature, and provided positive impetus in its emphasis on man's special worth as an image-bearer of God. This high view of man relative to nature provided motivation for man's intellectual conquest of nature by science (Glover, 1984). Science became tied to the creation mandate. Although proponents of the naturalist-uniformitarian system seek to preserve a special place for man in relationship to nature, they have lost the basis for doing so. Attempting to find a basis for man's transcendence in his being the "pinnacle of evolution" is a fraud, because man, the "pinnacle of evolution" remains within nature, and cannot transcend it in the same special sense of man, the "image-bearer." Once again, the naturalist system fails a formal test of consistency. Man assumes the ability to comprehend and control nature, but there is no possible justification for that relationship apart from Christian theology. Naturalism again applies biblical Christian axioms without justification, and utilizes them in its assault on biblical Christian conclusions.

The Understanding of History

Western man is unique in his reflexive understanding of his own existence in the context of history, derived ultimately from the Christian understanding of history as free from internal, mechanistic deterministic forces (Glover, 1984). History and nature are free from these forces because purpose originates in God, rather than in nature or some historical process; and nature's very existence is dependent in an ongoing sense on God. Since man exists in God's image, he transcends nature, and is not captive to its forces. This is expressed both in the concept of man's freedom (within biblical limits) and a resulting sense of purpose in history. This sense of purpose was not in history itself, but rather in a relationship with God which was driven by events unfolding in history. The historical mission of the people of God in both Old and New Testaments shaped the consciousness of western man. This mission-oriented sense of transcendent self-importance was commonly viewed in a Christian context up through the Enlightenment (Glover, 1984).

One expression of the biblical understanding of the relationship between God, man, and history is in the primitive Christian (i.e., early Church) concept of linear, progressive time (Cullmann, 1964, p. 32). Time, as a part of God's creation, has a definite beginning, and an equally definite end. History proceeds in a linear manner from the beginning to the end, guided by and reflecting the direct intervention of God in time. This understanding of time is quite different from that of most of the Greek cosmological framework. History was of little importance and time was cyclical. Salvation (i.e., deliverance from the physical plane and all its limitations) involved moving outside of the enslavement to the unending cycles of time to the timeless "beyond," and was therefore spatially oriented, in contrast to the Christian concept of salvation within time at a particular point on a line progressing towards blessedness in the endless time of eternity future (Cullmann, 1964, p. 52). Modern naturalism, which shares metaphysical commonality with majority naturalistic Greek views, has nevertheless appropriated the biblical view of progressive, linear time. This allows the incorporation of history into nature (Schlossberg, 1983 p. 141), but the self-imposed epistemological limits of naturalism preclude a metaphysical justification for any concept of time; and ontologically, the structure of naturalism itself does not positively support linear time. Note that evolution presupposes linear time rather than justifying it. Thus, the rejection of God and his purposeful providence in favor of chance removes the metaphysical rationale for linear time and progressive history. Even this most basic characteristic of evolution (and therefore geologic history) requires a biblical foundation.

Because geologists think in terms of the naturalist-uniformitarian system, the metaphysical contribution to a concept of time is largely ignored or misunderstood, as seen in this quote from a practicing geologist (emphasis added):

> Opposed to this theory (Huttonian cycles) was Thompson's [Lord Kelvin's mechanical model of the earth as a physical body obeying the newly enunciated laws of thermodynamics, with a strongly directional, but relatively short history, and a rapidly approaching cold death . . . Geologists could not accept Thompson's short time span, but were nevertheless forced to consider the implications of unidirectional history **imposed by the physicist.** (McLaren, 1978, p. 2) [emphasis added].

Attributing unidirectional time to the scientific discoveries of Lord Kelvin reveals a reductionist epistemology, rather than demonstrating any observational basis or unidirectional time. In addition to obvious contradictions when comparing the results of progress along 'time's arrow' between evolution and entropy, consider the following:

1) The concept of unidirectional time is biblical, preceded Kelvin by several millennia, and was certainly a part of his cultural metaphysical frame of reference.
2) Any system of reference for time apart from observations themselves is by definition metaphysical, rather than physical (since man's observational time-frame is insignificant on the apparent scale of the universe). Furthermore, no contemporary scientific observations could have evidenced unidirectional time as described by Kelvin.

No axiom can be proven by observation. For example, the concept of causality (a key principle of scientific inquiry cannot be derived empirically (Hume, 1777 in Steinberg ,1977, pp. 50-53). Neither can a reference framework of time be proven by observation.

Thus, the quote above illustrates how science in the naturalist system must (improperly) subsume philosophy and theology when attempting to explain its preconditions. As to any hopes that scientific progress will provide empirical evidence to justify the naturalist's framework of linear time, not only does Hume's objection remain unanswered within the context of naturalism but quantum physics has raised further questions and has answered few of the existing ones.

The most significant trend in the peculiar western understanding of history was its survival in the face of rejection of its requisite God-man relationship (Glover, 1984). Ironically, the historical self-concept has remained, and has continued to define secular western consciousness. Even after abandoning the God of history, western man has retained his sense of transcendent self-importance. This is a significant difference between modern western and pre-Christian pagans, who accepted the historical determinism of impersonal cosmic forces and condemned man's overzealous meddling in nature as "hybris" (Glover, 1984, p. 117). The same sense of transcendent self-importance that drove early Uniformitarians to conclude that they could conquer nature with their science can be derived only from the biblical doctrine of creation. Therefore, uniformitarianism as a system is internally contradictory until its proponents can derive an atheistic view of man relative to history that can justify his creative freedom from nature and history (expressed in the scientific enterprise), and a linear, progressive view of history. Conversely, the biblical-Christian system is consistent. Man's historical significance and historical perspective are legitimately derived from an appreciation that history is another facet of God's creation.

Conclusion

In summary, the naturalist-uniformitarian system fails the formal comparison of its conclusions and methods with its axioms. Ironically, axioms that are crucial to its very existence are shown to be theological conclusions derived from the Biblical doctrine of creation, and derivative God-man-nature relationships. Naturalists have not, and probably logically cannot provide a non-theistic formulation that would justify those axioms foundational to modern science. Simultaneously, it has been demonstrated that the biblical Christian framework passes these same formal tests. That comparison alone is sufficient to demonstrate that the naturalist system is false and that the biblical Christian system provides a valid framework for earth history analysis. The question remains of how to proceed with the task of historical analysis in a biblical Christian framework. In developing guidelines for that task that will support geologic models in succeeding parts of this contribution, additional formal flaws will be uncovered in the naturalist alternative. Future emphasis will be not on the already-demonstrated failure of naturalist-uniformitarian system, but rather on the development of a method for earth history analysis, and resulting geologic models of earth history within the biblical Christian system.*

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***Editor's Note: There have been many articles from a philosophical viewpoint on the origins controversy that have appeared in the Quarterly. It has been recognized by many creationists that a two-pronged approach is necessary in challenging naturalism; empirical data-gathering) studies as well as philosophical discussions. For a treatise on philosophy see Ancil, R. E. 1985. On the importance of philosophy in the origins debate. *CRSQ* 22:114-123.**

DEVONIAN FISH AND AMPHIBIANS AND THE GENE-THEME MODEL

COLIN BROWN*

Received 29 August 1994; Revised 7 September 1995

Abstract

Certain fish and amphibians from Devonian rocks share common features. Line after line of this fish evidence for evolution, however, has been removed with the uncovering of new data. One main linking candidate remains, but even this is now on the verge of collapse, leaving my creationist alternative view of why they share features (the gene-theme model) emerging as the strongest contender for fulfilling the role as the answer to why there are shared features.

The oldest known amphibian is now viewed to be 360 million years old on the evolutionary time scale. The creature, known as ***Ichthyostega,*** shares a number of features with certain types of fishes in and around that time. For example, both ***Ichthyostega*** and the fishes have the type of vertebrae known as arch vertebrae (Figure 1). Another similarity is the pattern on the surface of the teeth, the similarity persisting down to the microscopic level. The brain capsule is similar in that it is in two parts. The skull pattern is also similar (Figure 2).

Several fish types have been linked to ***Ichthyostega*** over the years, such as coelacanth, lungfishes, and eusthenopteron, but all such ties have since been abandoned.

In recent years, a number of other fossil amphibians have come to light. One of them, ***Acanthostega,*** has eight digits. It is found to have a brain case similar to the fish ***Moythomasia,*** a form of ray-finned fish dated at 377-367 million years (Clack, 1994, p. 393), while ***Acanthostega*** is given the age of 360 million years (Coates and Clack, 1990).

A form of ***Ichthyostega*** has been discovered with seven digits, and another amphibian named ***Tulerpeton*** with six digits, both younger than ***Ichthyostega.*** At present, fish known as panderichthyids are viewed to be closest to amphibians. These seem to range from 378 million years onward. They have paired fins and, like ***Ichthyostega,*** they have a finned tail. One of the more well-known members, ***Elpistostege,*** was originally identified as an amphibian due to the pattern of plates that make up the skull. Therefore, two amphibians were formerly identified as fish (Ahlberg and Milner, 1994, p. 508). ***Elpistostege*** is dated at about 360 million years. These fish also have several specialized features. This situation therefore raises questions over their alleged connections with amphibians.

Enter the Gene-Theme Model

Several types of fishes have been removed from the amphibian line. The gap between ***Ichthyostega*** and these fishes is geologically short on the evolutionary time scale. The plates in the skulls follow no particular order, and also fish are identified as amphibians and vice versa. All the foregoing facts point to that which I have called the Gene-Theme model (Brown, 1987a, b, 1989a, b, 1991). Within this model God could have created both fishes and amphibians with all of these similar features or He could have created these creatures with some of them, while others could have arrived via adaptation as part of the creature's genetic variation potential.

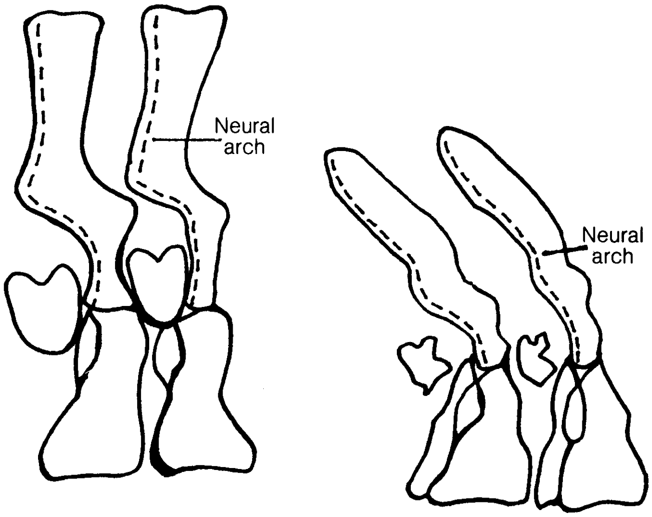

Figure 1. Both creatures share the arch type vertebrae. On the right fish on the left amphibian. Drawing by Lee MacPherson.

The Law of Symmetric Variation

The way amino acids are coded and arranged into families ensures that some changes in the bases of the codons that code for amino acids will produce the same amino acid and therefore symmetric changes, while other changes via mutation will produce a variation within the chemical group or family to which it belongs, giving a variational change. Any change which takes an amino acid beyond the group to which it belongs, will either be repaired by the repair system, if undesirable, or allowed to remain, if not harmful, as part of the broader expression of the law. Anything that is unhelpful and is not returned to the symmetric position by the repair system could result in the organism's removal from the population. All other genetic changes are merely vehicle systems for the law. The organism's variation potential is so enormous that it will ensure that kinds may adapt to almost any environment, provided the correct variation is there at the time. A human pair could, if they lived long enough, produce more variations than the number of atoms in the know universe before producing a person identical to their first offspring.

The Pentadactyl Limb

The discovery of amphibians with more than five digits does not in any way detract from my 1983 paper

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*Colin Brown, 61 Derby Road, Golborne, Warrington, WA3-3LE, England.

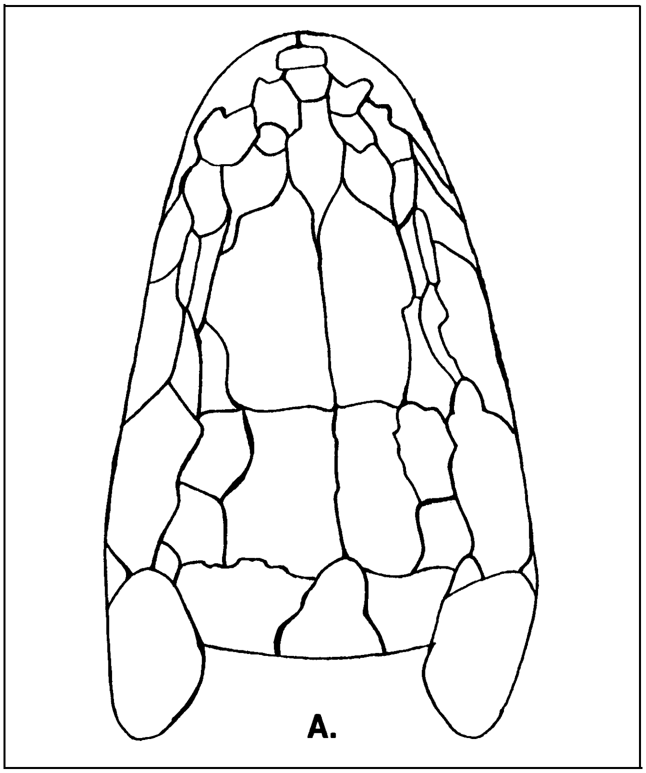

Figure 2. Skulls are: A. Eusthenopteron

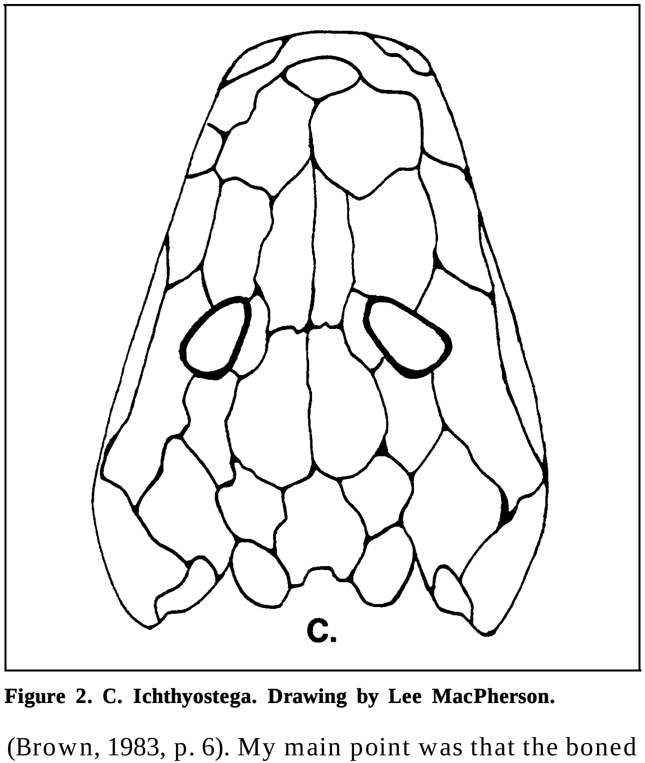

Figure 2. C. Ichthyostega. Drawing by Lee MacPherson.

(Brown, 1983, p. 6). My main point was that the boned limb with its basic design is the best type of limb. Indeed, in terms of digits, the fox and other members of the dog family have only four digits, while the frog has two of its limb bones fused, but this is merely variation within the basic boned limb which, as I mention in the paper, can occur.

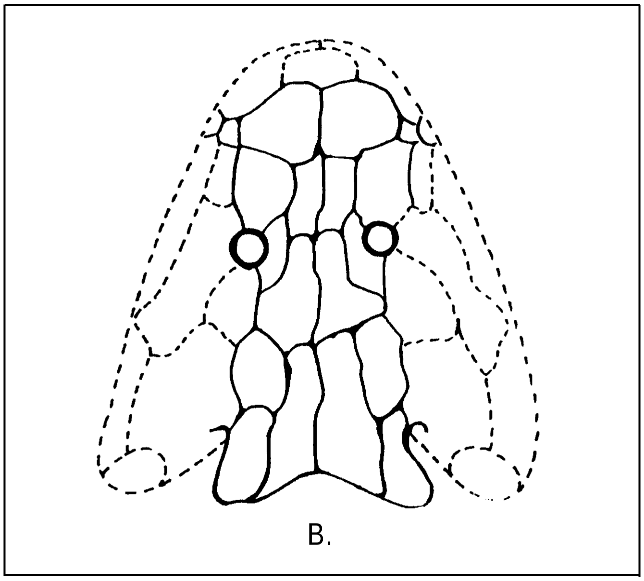

Figure 2. B. Elpistostege

The whole situation surrounding the Devonian fishes and amphibians does indeed seem to bear very well for the Gene-Theme Model and the Law of Symmetric Variation, the two most important principles in biology. Therefore, creation is beginning to win the day as more and more fossils are being discovered.

Table I. Dates for fish and amphibians and the growing evidence for the gene-theme model.

	Amphibians	Fish
	Ichthyostega	*Eusthenopteron*
360 myrs	*Acanthostega* *Tulerpeton*	*Elpistostege*
	Hynerpeton	
370 myrs	*Strong Legs*	
		Moythomasia
380 myrs		*Panderichthyrids*
390 myrs		*Osteolepiforms*
400 myrs	Start of Devonian Rocks	

Footnote

After I had finished the paper two more fossil discoveries came to light. Amphibian remains dated at 365 million years, given the name ***Hynerpeton,*** show that the gap between 365 and 370 million years is filled with amphibians. To complete this view, amphibian remains have been found which are dated at 370 million years (Strong enough, 1994, p. 17). The panderichthyids are first found at 378 million years. The further back we discover amphibian remains along side the continued lack of intermediate forms will clearly signal the end of the evolutionary theory. If we allow at least a three million year history on the evolutionary scale for the amphibian at 370 million years, then clearly a time range from 378 million years will not be enough to evolve into an amphibian. To make things worse, going beyond 380 million years likely means that the fish assigned to the time are in less of a physical condition, such as ***Osteolepiforms,*** to produce an amphibian. We have seen with the case of strong legs, that it is logically possible to show that 10 million years is not enough to evolve into such an amphibian. In like manner the same would apply to any other amphibian discoveries, thus if remains were found at 375 million years then one could cover a 10 million year period up to 385 million years. Hence, the further back we find amphibian remains along with the lack of fossil intermediates the stronger the case for the Gene-Theme model and for creation. See Table I for the dates.

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CRSQ-Creation Research Society Quarterly.

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Strong enough to leg it when the going got tough. 1994. *New Scientist* 143(1937):17.

Editorial Note: After this paper had been accepted, cranial remains of a new genus- *Elginerpeton* -were reported from the Upper Devonian of Scotland (Scat Craig beds, Upper Frasnian). It is not clear whether this genus had feet or fins, but it was assigned to the Tetrapoda on the basis of cranial characters. Perhaps these finds will result in showing that amphibians existed even lower in the stratigraphic record. The references are:

Ahlberg, P. E. 1995. *Elginerpeton pancheni* and the earliest tetrapod clade. *Nature* 373:420-424.

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THE PHANTOM BRIDGE EXPOSED: THE LATEST TURTLE ATTACK

RANDALL L. MARTIN*

Received 10 January 1995; Revised 15 September 1995

Abstract

Do turtles have common ancestors that evolved many turtle-like traits before they acquired shells. So claim recent papers by Michael Lee published in Science and Natural History. An artist's conception of lizard-to-turtle progression was demonstrated and published by this author; but only one photograph of a skeleton was documented. Forty-five lizard-like creatures were divided into seven groups each and similarities were delineated. Yet, Lee's technical paper stated that "evidence uniting captorhinid . . . with turtles is shown to be weak." No statistical significance is documented. In fact the author of these theories admits to a luck of objectivity and to the embarrassment of persistent gaps in the continuum of life.

Introduction

Recently, Lee published his reasons for believing that turtles evolved from a lizard-like ancestry (Lee, 1993, 1994). He produced five drawings showing a hypothetical transition. These drawings have been redrawn in Figure 1 to demonstrate the body and cranial structures.

Unfortunately, these five drawings have many problems in terms of the reality of the organisms that they represent and that is why they are phantom drawings. The abstract of Lee's technical paper states that, "Evidence uniting captorhinid . . . with turtles is shown to be weak." (Lee, 1994) A question the reader should ask is that if the relationship between ***Captorhinus*** and ***Proganochelys*** is weak, then why make it part of the proposed progression? Thus the author states that ***Captorhinus*** which he draws as a non-vertebrate (in reality it is a vertebrate-a reptile), should be excluded in hypothetical progression of the vertebrate lizards. Yet in the popular article, Lee schematically includes ***Captorhinus*** in his diagrammatical sketches.

Most creationist and evolutionist biologists would agree that the "oldest" fossil turtle, ***Proganochelys,*** is a valid and legitimate primitive turtle. Notice how similar this turtle looks to the turtles of today (Frair, 1991, Figure 2). Therefore, it is easy to see why somebody would associate the ***Proganochelys*** turtle reported to be 210 million years old to the turtles we have today. In fact, Frair states this about ***Proganochelys,*** "The first turtles, although differing in some features from extant forms, clearly were turtles." (Frair, 1991, p. 22) Also, evolutionist Jackel says that, "They are already unquestionably turtles in most features of their anatomy and show little if any affinity with other groups of reptiles." (Carroll, 1969, p. 9).

Lee went to the University of Illinois to search for 45 specimens which he classified into seven different groups in order to form his background data. Next, he

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*Randall Martin, M.D., 225 Carmel, Dundee, Oregon, 97115.

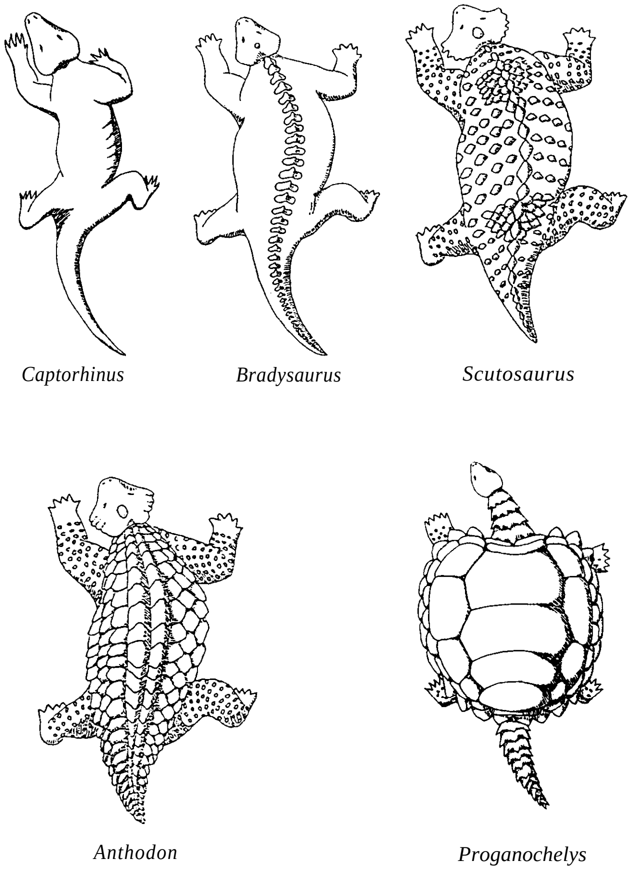

Figure 1. Artist Kevin Flanagan's conception of body and cranial features of several fossil specimens (after Lee, 1994). Some of the reptile species have bony plates, which were interpreted by Lee as a bridge leading to turtles.

organized the different groupings of lizard skeletons and then purported to document common features within his groupings stating that there are 16 common features between ***Proganochelys*** and the entire group of other drawings. Within these 16 common features, nine are cranial similarities, two are vertebral similarities, two are shoulder similarities, and three are hind limb similarities. In Lee's technical paper cranial similarities are the most common finding; yet his drawings emphasize various plate structures on the shell and how they transformed into the shell. If he is researching cranial differences and finds nine of 16 are cranial comparisons, then Lee should be drawing more about cranial similarities and using that as a basis of schematical representation as have other previous authors (Gaffney, 1990).

Next, Lee includes ***Captorhinus*** into his phantom drawings (Lee, 1994). To look at similarities between ***Proganochelys*** and the other drawings Lee finds more common features as well as the 16 original common features mentioned above. Of the nine additional common features, one is vertebral, three are shoulder, three are extremity, one is dermal armour and one is gastralgia. Again, only one vertebral finding is reported. It seems that Lee is trying to say there are more features that are common between the middle three drawings of lizards than there are of the first four. Lee is trying to show that the first lizard is less linked to the drawings than the others are. Then why include it in the drawings?

Yet the main problem with this type of analogy is that the investigators first put the different bones in different piles separating them in the first place and grouping them into groups and then, after sorting, find all these similarities between the different groups.

This is like trying to classify houses by saying one is traditional, another is colonial, and the third contemporary and then trying to find more similarities between the traditional and colonial than between the contemporary and colonial. In other words, it is not objective or fair to classify first and then find similarities after already using the similarities for classification. Is this proper objective scientific method? Perhaps some of the colonial houses would look traditional to me; yet to other people they may look a little different. Lee's work lacks a control on the observer-reporter database method.

The small plates, called scutes in some references, Lee reports are

> embedded in the skin over the backbone [of lizards]; in later forms these plates, spread out over the sides and belly, and enlarged and fused with one another to form a rigid carapace-just like a turtle shell. (Darwin, 1902; Lee, 1994, p. 63.)

When studying the diagram showing the various lizard-like transformations one is led to imagine a large uniformity and increase of the plates for each one of the various representative lizards. Yet when one reads Lee's technical paper, only one skeleton is pictured that demonstrates any type of dermal armour, and this photograph looks more like the skeleton of a dead rat without any plates that are observable to the eye. Furthermore, if you check some of the references you find that only one skeleton demonstrated dermal armour in all the skeletons examined. This was a single parieasaur thought to be young and the plates were not fused, nor did they overlap. It seems to me that the diagrammatical scheme such as these phantom drawings based on only one known fossil of a premature or adolescent lizard is a little too presumptuous to base this large leap in progressive plated lizards which Lee has drawn as factual data. There was no photographical depiction in Lee's references.

Furthermore, reference to Boonstra 1934 (cited in Lee, 1993) has been updated by Boonstra in 1969 to

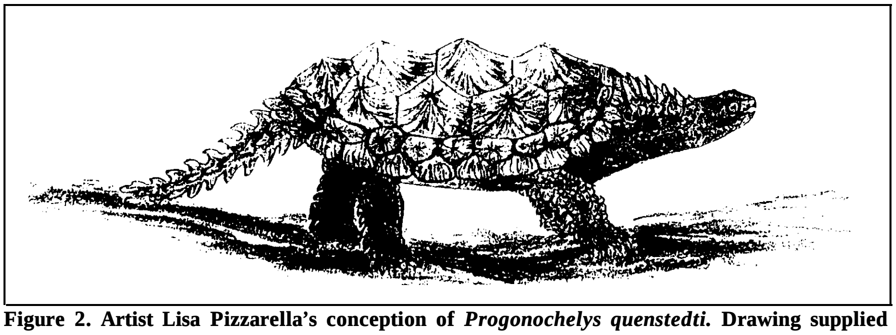

Figure 2. Artist Lisa Pizzarella's conception of *Progonochelys quenstedti.* Drawing supplied through the courtesy of Dr. Wayne Frair.

"reduce the numbers of valid genre and species from this zone considerably." (Findlay, 1970, p. 15.) If anything can be extracted from the single skeleton it is that at one point there existed a lizard that had ossified changes. Whether or not this is an animal that existed in great numbers and thrived at a period of time in our history is unknown. Functionally, it would seem almost impractical for one to confer any protectiveness by plates on the dorsum of a lizard. On the dorsum of a lizard the vertebral column and ribs already protect it from posterior attack. The lizard is fast and very mobile. It seems that the biggest threat to any lizard would be a predator which would turn it over and attack it from its vulnerable ventral side. Here one could imagine that if changes were to confer any protection, a shield much like the sternum on the anterior aspect would be the most functionally logical place to develop it. If lizards were truly evolutionary ancestors of turtles, one could make a functional argument that plates formed and were fixed together on the ventral surface of the lizard protecting the vital structures, the heart, lungs, abdominal contents from predators. Why would a lizard add another protective layer on its already protected dorsum? It would only make it more cumbersome and heavy and more difficult to get away from its predators.

Another functional problem with Lee's model is his statement that the round structure of the swimming turtle is an advantage over the long, slender lizard. Here he implies that a round structure is easier to maneuver than a slender structure. However, as a canoer I have found that paddling a canoe is much easier than paddling a row boat, especially against current. Therefore, it seems that a lizard-like body and swimming ability would confer much more protection from prey via maneuverability.

One of the most difficult parts of any scheme to detect changes in animals occurs when one has to take structures and totally transpose them across other major structures. This is the case when Lee tries to take the shoulder girdle and shoulder blade, which exists on the exterior dorsum surface of the ribs in a lizard and put them underneath a shell of the turtle carapace. His diagrams again are inadequate to show that transformation. No skeleton documentation is presented, and therefore this theory is very speculative. No skeletons are offered as examples of that transition, although he tries to show similarities between the lizards and the primitive turtle. It seems to me that there would be no functional advantage for placing the shoulder blade inside the turtle shell. In fact, it would be easier to maneuver if the shoulder blade and leg were outside the shell and there were bones that would use the shell as a fulcrum for maneuvering in a more rapid and large swinging motion.

The low points of Lee's articles are his emotional outcries against the embarrassing and persistent gaps. As he states,

> One is reminded of the crack about the atheist who couldn't prove that God didn't exist-and so took it on faith. Indeed recent paleontological finds have plugged some of the most embarrassing and persistent gaps in the continuum of life . . . (Lee, 1994, p. 63).

One would wonder why Lee is so embarrassed. Why would he throw rocks at former atheists who try to prove God does not exist and then find God does exist? Are these statements of someone who is objective or of someone who has an axe to grind? Why should one believe that he is objective and have regard for his data when emotional bias reaches his pen in this way?

Lee was somewhat truthful about his non-objective bias. He states, "Scientists are no more objective than other people; what we see is heavily constrained by what we expect to see." (Lee, 1994, p. 63.) Does this seem like an investigator who is biased toward what he wants to find? The sketches that Lee and other evolutionists make of such transitions should not be schematically constructed. Only actual fossilized transitions should be allowed as scientific proof.

Darwin stated in his book, ***The Origin of the Species,***

> **. . .** the geological record is extremely imperfect . . . these causes, taken conjointly will to a large extent explain why-though we do find many links-do not find interminable varieties, connecting together all the extinct and existing forms by the finest graduated steps. . . . He who rejects this view of the imperfection of the geological record, will rightly reject the whole theory." (Darwin, 1902, pp. 341-342.)

In summary, the turtle morphology is an excellent example of a species whose fossils appear abruptly without apparent evolutionary evidence of ancestors. Although they remain a target of evolutionists, no current model of evolution has yet explained the functional arrangement, serum protein similarities and functional aspects of this remarkable and isolated species. The turtle remains a model of the creationist view of origins.

I wish to acknowledge the helpful insights contributed by Dr. Wayne Frair.

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***For additional information on evolutionary efforts to solve the mystery of turtle origins see Lee, Michael S. 1996. Correlated progression and the origin of turtles.** *Nature* **379:812-815.**

FOUNTAINS OF THE GREAT DEEP: THE PRIMARY CAUSE OF THE FLOOD

ALLEN ROY*

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Abstract

A ***word study of "ma'yan" (fountain,*** KJV) ***found in Genesis 7, 8 shows that the word would there be better translated "reservoir." It makes more sense that a container would be broken up than a jet*** of ***water. The reservoir that contains the deep (global oceans) is the oceanic depressions on the crust of the earth. It is the crust that was broken up causing massive tectonic movement and associated tsunami catastrophe--i.e. The Flood.***

Introduction

To the uniformitarian mind, which conceives millions and billions of inches of precipitation moving millions and billions of cubic miles of soil over millions and billions of years, the concept of any kind of rainstorm of only 40 days, 150 days or even a year's duration is inconsequential at the very, very best. That such a "flood" could be the cause for all global sedimentation, for the orogeny of the mountain complexes across the entire world, and for vast continental tectonic movement is preposterous.

Many creationists agree that even the collapsing of the 'water above the firmament' would not cause the catastrophic destruction seen in the geologic record. Therefore, they recourse to the other factor mentioned by the Bible-the "fountains of the great deep." Oard (1990, pp. 28, 29) says:

> The second mechanism of the Flood which has post-Flood climatic consequences is the fountains of the great deep specific in Genesis 7:11. There is little information in the Bible as to what these were. The Bible says all of them burst open on the first day of the Flood, and that enough water was available to cover all the mountains all over the earth (Genesis 7:19). Since the amount of water in the vapor canopy was too small for a global flood, the water from the fountains, which would be part of the ocean today, would need to be considerable.

Again, the uniformitarian wonders where all this water was stored. Was it ground water similar to what is now in the rocks and soils? If it was, then the same problem exists because the quantity of ground water is woefully unable to flood the whole earth.

On the whole, creationists have skimmed over this problem. Oard (1990, p. 29), while referring to Whitcomb and Morris (1961, p. 9), simply states, "Where could this water have come from but below the ground or oceans?" Brown (1986) proposes that water, stored in vast chambers many miles below the surface, burst through as violent fountain-jets and covered the earth in a flood. Oard (1990, p. 29) described the concept this way:

> Any water erupting from this source (the deep) [below ground] would move out, under pressure from the crust, and hence would shoot up into the air. The ejected water would produce fountains. In order to release the necessary amount of water, many holes and cracks in the earth would have opened. A world wide eruption of the fountains of the great deep would be expected to be accompanied by extensive tectonic activity. The tectonic activity would cause immense tidal waves and churning of the water, as the ocean level rose above the mountains.

Violence might indeed ensue, but by what unknown means, for which there is no physical evidence, was this water held in place before the "Flood"?

The New International Version (NIV) of the Bible interprets the "fountains" as "springs" of the great deep. In the late 1970's, deep sea hydrothermal vents were discovered and some have thought to associate them with the Biblical "springs" of the great deep (Austin, 1981). However, Lee (1992, p. 16) explains that they

> are probably not the springs or fountains mentioned in Genesis 7:11, since they seem to be a side effect of seawater flowing through heated, fractured ocean crust, and not exit sites for an underground source of water.

I would like to propose an alternative view of the 'fountains of the great deep' based on clear and consistent interpretations of the words and texts of the Bible that will provide a reasonable and excellent source of water for the Flood. Let's begin with the beginning:

Genesis 7: 11

> ". . . the same day were all the fountains of the great deep broken up, . . ."
>
> ". . . on that day all the springs of the great deep burst forth, . . ." NIV

Because the 'fountains' are OF the 'great deep' it is important that we first discover what is this 'great deep.' The word 'deep' is translated from the Hebrew word 'tehom' (Strong) and is used 34 times in the Bible. Nineteen times 'tehom' is translated as 'deep.' five times as 'depth' and 10 times as 'depths' in the KJV Let us look at some uses of 'tehom' to get a better understanding of what it means.

Psalms 135:6

> "Whatsoever the LORD pleased, that did he in heaven, and in earth, in the seas, and all 'deep' places." KJV
>
> "The LORD does whatever pleases him, in the heavens and on the earth, in the seas and all their 'depths'." NIV

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*Allen Roy, P.O. Box 516, College Place, WA 99324.

Isaiah 51: 10

> "Art thou not it which hast dried the sea, the waters of the great 'deep'; that hath made the depths of the sea a way for the ransomed to pass over?" KJV
>
> "Was it not you who dried up the sea, the waters of the great 'deep,' who made a road in the depths of the sea so that the redeemed might cross over?"

Psalms 106:9

> "He rebuked the Red sea also, and it was dried up: so he led them through the 'depths,' as through the wilderness." KJV
>
> "He rebuked the Red Sea, and it dried up; he led them through the 'depths' as through a desert." NIV

Jonah 2:5

> "The waters compassed me about, even to the soul: the 'depth' closed me round about, the weeds were wrapped about my head." KJV
>
> "the engulfing waters threatened me, the 'deep' surrounded me; seaweed was wrapped around my head." NIV

It is obvious that in these verses, the term 'tehom' refers to the sea, the oceans, the large bodies of water on the globe. In only two of the 34 verses does it appear to refer to waters coming out from the ground (Deuteronomy 8:7 and Ezekiel 31:4). It makes sense to use the most common meaning of the word unless special contextual evidence demands otherwise. So, let us now substitute 'oceans' for the word 'deep' the text to see how that changes things

Genesis 7: 11

> ". . . the same day were all the fountains of the great 'oceans' broken up, . . ." KJV
>
> ". . . on that day all the springs of the great 'oceans' burst forth, . . ." NIV

The word 'great' comes from 'rabbah' which means 'abundant' (Strong). Place 'abundant' with 'oceans' and you get 'abundant oceans' which can mean 'global water masses.' In the Hebrew language the phrase 'tehom rabbah' (great deep) became "a compound noun and was stereotyped and therefore always used without the definite article." (Hasel, 1974, p. 70) This means that there was not "this or that" great deep or 'a' great deep among many, but rather an all encompassing great deep. Again substitution gives us:

Genesis 7: 11

> ". . . the same day were all the fountains of the 'global water masses' broken up, . . ." KJV
>
> ". . . on that day all the springs of the 'global water masses' burst forth, . . ." NIV

"The Hebrew word te'hom is translated by Gesenius as 'Urwasser, Ozean, das grosze Weltmeer. Delitzsch translates it with 'unfathomable ocean'." (Rehwinkel, 1951. p. 100) Now that we have an idea what the 'great deep' could be, let us move on to the 'fountains'

In the Old Testament of the King James Bible, the word 'fountain' is translated from five different Hebrew words (see Table I), each of which has a different meaning (see Table II).

Table I

KJV/NIV	#	Cistern	Fountain	Spring	Well	Other
'asheded	3	---	---	3/0	---	0/3
'ayin	21	---	11/4	0/15	10/1	0/1
Eyan	1	---	---	0/1	1/0	---
Be'er	31	---	---	---	31/31	---
Bo'r	1	1/1	---	---	---	---
Bowr	12	4/5	1/0	---	7/7	---
Gal	1	---	---	1/1	---	---
Gullah	4	4/4	---	---	---	---
Mabbuwa'	3	---	1/0	2/3	---	---
Maqor	14	---	11/16	3/4	0/1	0/3
Ma'yan	23	---	16/2	2/20	5/1	---
Motsa	3	---	---	3/3	---	---
Nebek	1	---	---	1/1	---	---
Totals		9/10	40/12	15/48	54/41	0/7

(from Strong)

Table II

'ayin:	an eye, by analogy a fountain (as the 'eye' of the landscape).
Bowr:	a pit hole (a cistern or prison).
Mabbuwa:	a fountain (in the sense of out pouring)
Maqor:	something dug, a source
Ma'yan:	from 'ayin: a fountain name, or fountain

(from Strong)

This should make us suspect that the word "fountain" is only an approximation for the words in the original language. To complicate things further, the word in our text, "ma'yan." is elsewhere translated twice as springs, and five times as well or wells (Strong, 1890). When we look above at how the translators treated the same Hebrew words, one has to wonder just how sure the translation process is. It seems as though the Hebrew words were treated as if the were synonymous and interchangeable. Occasionally, some English words have the same or similar meanings, yet specific definitions make each one unique. Common sense tells us the same must occur in Hebrew.

In a general sense, the words fountain, spring, well, and cistern can mean the same thing-a source (of water). Our word Ma'yan is used just that way in several places in the Bible, both literally and figuratively:

Literally:
II Kings 3:19

> "And ye shall smite every fenced city, and every choice city, and shall fell every good tree, and stop all wells (sources) of water, and mar every good piece of land with stones." KJV
>
> "You will overthrow every fortified city and every major town. You will cut down every good tree, stop up all the springs (sources of water), and ruin every good field with stones." NIV

2 Chronicles 32:4

> "So there was gathered much people together, who stopped all the fountains (sources of water), and the brook that ran through the midst of the land, . . ." KJV
>
> "A large force of men assembled, and they blocked all the springs (sources of water) and the stream that flowed through the land. . . ."

Table III

Be’er	Well/s	at Esek, Sitnah, Rehoboth, Shiba
Bowr	Cistern	at Sechu, Sirah, Bethlehem
Ma’an	Fountain	at Nephtoah
‘ayin	Spring/s	at The way to Shur, Nahor, Elim, Jezreel

(from Strong)

(See also: I Kings 18:05, II Kings 3:25, Psalm 74.15, Psalm 84:16, Psalm 104:10, Hosea 13:15.)

Figuratively:
Psalms 87:7

> “As well the singers as the players on instruments shall be there: all my springs (sources) are in thee." KJV
>
> “As they make music they will sing, ‘All my fountains (sources) are in you'." NIV

Isaiah 12:3

> “Therefore with joy shall ye draw water out of the wells (sources) of salvation." KJV
>
> “With joy you will draw water from the wells (sources) of salvation.” NIV

(See also: Proverbs 5:16, Song of Solomon 4:12, Song of Solomon 4:15, Jol 3:18.)

There are more specific meanings for fountain. Along with the words spring and well, fountain can refer to a natural flow of water coming from the ground. It can also refer to a small reservoir for holding liquid such as for an oil lamp or for ink in a printing press. And, fountain can be a jet of water in a basin structure or the basin itself.

Obviously, before we can assign a specific definition from the above possibilities, we must first study the remaining verses of the Bible that use “ma’yan” (Genesis 7:11, Genesis 8:02, Leviticus 11:36, Joshua 15:9, Joshua 18:15, Psalm 114:8, Proverbs 8:24, Proverbs 25:26, Isaiah 41:18). Our primary clue is found at the ancient site called Nephtoah.

Joshua 15:9

> “And the border was drawn from the top of the hill unto the ‘fountain’ of the waters of Nephtoah," KJV
>
> “From the hill top the boundary headed toward the ‘spring’ of the waters of Nephtoah," NIV

Joshua 18:15

> “and the border went out on the west, and went out to the ‘well’ of waters of Nephtoah." KJV
>
> “and the boundary came out at the ‘spring’ of the waters of Nephtoah." NIV

At Nephtoah ”. . . there is a copious spring called by the name of Samuel, which not only supplies large basins, but waters a succession of blooming gardens . . .” (Keil and Delitzsch, 1980, p. 154). Nephtoah is “. . . generally identified with Lifta, a village with a large fountain, the waters of which are collected in a great walled reservoir of very early origin . . ." (Cheyne, J. K., 1902) This reservoir makes “ma’yan” unique among the digged pit wells, cisterns, and springs that are associated with the other Hebrew words that are also translated as ‘fountains.' ‘springs’ and ‘wells’ (see Table III).

A fountain as a reservoir rather than water jets is typical in history.

> ‘An early example [of a fountain] is preserved in the carved Babylonian basin (c. 3000 BC) found at Tello, the ancient Lagash in Mesopotamia. An Assyrian fountain discovered in the gorge of the Comel River consists of basins cut in solid rock and descending in steps to the stream. Small conduits led the water from one basin to the other, the lowest of which was ornamented by two rampant lions in relief. . . . springs were frequently considered sacred and shrines were built around them, the water often emerging into artificial basins. In Roman civilization, water was distributed from each terminal reservoir, or castellum, to baths and large houses as well as to many public fountains that supplied the bulk of the population. (Encyclopaedia Britannica, 1991).

If the writer of Genesis 7 and 8 had wanted to communicate the concept of water jets, he could have used words like: “nebek” (to burst forth), “‘asheded” (an out pouring) or “mabbuwa” (to gush forth). Instead, he used “ma’yan” (a reservoir). These words were used in other verses of the Bible for gullies, springs and fountains.

None of the sites mentioned in Table III are known to be artesian-that is, a jet of water naturally squirting up out of the ground-nor have they artificial jets of water. Therefore, I propose that “ma’yan” would be better translated as ‘reservoir’ in these remaining verses. Let’s see how ‘reservoir’ works:

Joshua 15:9 becomes

> “And the border was drawn from the top of the hill unto the ‘reservoir’ of the waters of Nephtoah," KJV
>
> “From the hill top the boundary headed toward the ‘reservoir’ of the waters of Nephtoah," NIV

Psalms 114:08

> “Which turned the rock into a standing water, the flint into a ‘fountain’ of water." KJV
>
> “Who turned the rock into a pool, the hard rock into ‘springs’ of water." NIV

Becomes:

> “Which turned the rock into a standing water, the flint into a ‘reservoir’ of water." KJV
>
> “Who turned the rock into a pool, the hard rock into ‘reservoirs’ of water." NIV

Proverbs 25:26

> “A righteous man falling down before the wicked is as a troubled ‘fountain,' and a corrupt spring." KJV
>
> “Like a muddied ‘spring’ or a polluted well is a righteous man who gives way to the wicked." NIV

Becomes:

> “A righteous man falling down before the wicked is as a troubled ‘reservoir,' and a corrupt spring." KJV
>
> “Like a muddied ‘reservoir’ or a polluted well is a righteous man who gives way to the wicked." NIV

Proverbs 8:24

> "When there were no depths, I was brought forth; when there were no 'fountains' abounding with water." KJV
>
> "When there were no oceans, I was given birth, when there were no 'springs' abounding with water." NIV

Becomes:

> "When there were no depths, I was brought forth; when there were no 'reservoirs' abounding with water." KJV
>
> "When there were no oceans, I was given birth, when there were no 'reservoirs' abounding with water." NIV

In each verse the word reservoir fits very well and even makes the verses easier to understand. Let's now see how it fits into our text:

Genesis 7:11

> ". . .the same day were all the 'reservoirs' of the 'global water masses' broken up, . . ."
>
> ". . . on that day all the 'reservoirs' of the 'global water masses' burst forth, . . ."NIV

We do not call a fountain pen a 'fountain' pen because it squirts jets of ink all over the place. If that were so, they would soon be very unpopular. The reason they are called fountain pens is because they have a fount-i.e. a reservoir-which holds the ink. It is in this sense that the Genesis 7:11 'fountains' make the most sense. After all, it is the 'fountains' that are broken up. The reservoirs which hold or contain the oceans in basins are broken up and burst open. So now, let us substitute the words 'containers' or 'basins' for 'reservoirs' in our text.

Genesis 7:11

> ". . . the same day were all the 'containers' of the 'global water masses' broken up, . . ." KJV
>
> ". . . on that day all the 'basins' of the 'global water masses' burst open, . . ." NIV

The text is beginning to make grammatical sense. The most common interpretation of this text has the object of the preposition-'tehom' (the 'deep'-misunderstood to be the ground)-being acted upon. After all, it is easier to imagine the ground being broken, rather than jets of water. But in reality, it is the noun-"ma'yan" (reservoir)-that is being broken.

The phrase 'broken up' comes from 'baqa.' (Strong) "Moses stretched forth his hand over the sea and divided (baqa) it. The idea is a splitting apart of the waters. According to Judges 15:19 God 'split open' (baqa) the hollow place and water came from it. In Isaiah 48:21 it is stated that he 'cleft' (baqa) the rock . . . in these verses the same verb . . . has consistently the meaning of bursting forth, dividing, cleaving, splitting open." (Hasel, 1974, p. 70) With that in mind, let us go back to the verse to see this point.

Genesis 7:11

> ". . . the same day were all the 'containers' of the 'global water masses' 'divided' . . ." KJV
>
> ". . . on that day all the 'basins' of the 'global water masses' 'split open,' . . ." NIV

The "ma'yan" is that part of the globe which holds the waters in vast reservoir depressions-i.e., the crust. the breaking forth of the fountains of the great deep would, then, mean that the ocean broke out and poured over the land. . . . But the statement that the fountains of the great deep were broken open implies a great deal more. It means that the earth was rent, that great fissures and chasms appeared on the surface of the earth." (Rehwinkel, 1951, p. 100,191) A breakup of the earth's crust would cause tremendous, catastrophic flooding as innumerable tsunamis sweep over the entire globe. The concept of plate tectonic breakup and 'drift' on an accelerated schedule fits well with Genesis 7:11. Combined with the collapse of the "waters above the firmament," the breakup of the crust would cause a global catastrophe.

The end of the Flood is described in the same terminology as the beginning.

Genesis 8:2

> "The fountains (ma'yan-crustal basins) also of the deep (oceans) and the windows of heaven were stopped, . . ." KJV
>
> "Now the springs (ma'yan-crustal basins) of the deep (oceans) and the flood gates of heaven had been closed, . . ." NIV

The stopping of tectonic movement would terminate tsunami action and allow the displaced, agitated waters to fully drain from the highlands into newly formed basins on the crust.

In summary: The word ma'yan, that is translated as 'fountains' in some verses of the KJV, would be better translated as 'reservoirs' or 'basins,' It makes more sense to break up a reservoir basin than a jet of water. Since the oceans of the earth are the 'great deep.' and the Ma'yan are reservoirs, then the 'fountains of the great deep' would be the reservoir basins on the crust of the globe that hold the oceans and bodies of water.

Genesis 7:11 would be better translated as:

> ". . . the same day were all the ocean basins divided" KJV
>
> ". . . on that day all the ocean basins split apart . . ." NIV

And Genesis 8:2 becomes:

> "The convulsing ocean basins and the windows of heaven were stopped, . . ." KJV
>
> "Now the surging oceans and the flood gates of heaven had been closed, . . ." NIV

The rains of the Flood have long been given top billing over the 'fountains' of the deep. But, the Bible gives priority to the 'fountains' and so should we. The breakup of the crust and continental masses would be the primary cause for high energy, high volume water reaction across the globe. The rainstorms for 150 days would be a contributing factor, but the forces evident in the geologic record depend upon catastrophic crustal movement.

While Uniformitarians would not be any more receptive to this catastrophic episode, it would provide a much bigger concept than 40 days of rain. This is an idea that cannot be so easily dismissed because of the obvious catastrophic events evident in the geologic record. The rise of neo-catastrophism makes a deluge caused by vast tectonic activity less odious.

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LETTERS TO THE EDITOR

Matthew Fontaine Maury Not a Young Earth Creationist

Introduction

While I am not a member of the Creation Research Society, I read with interest the article about Matthew Fontaine Maury in the September, 1995 issue. I believe there are some errors in the article which need to be corrected. On page 86 the author wrote: “Lewis, at the very close of his biography, quotes a lengthy passage from the Richmond ***Times*** written by Virginia Lee Cox.” It is not correct that the author quoted Mrs. Cox; it was actually a publisher’s note inserted in Lewis’s book (Lewis, 1927, pp. 251-252).

The article does not explicitly state that Mr. Maury was a young earth creationist, but the fact that this story appears in the ***Creation Research Society Quarterly*** certainly gives that impression. That this is not the case can be seen from a book compiled by his daughter Diana Fontaine Maury Corbin (1888, pp. 158-160). The book contains on these pages a letter to ***The Southern Churchman*** written in 1855. Mr. Maury wrote:

> I pass by the history of creation as it is written on the tablets of the rocks and in the Book of Revelation, because the question has been discussed so much and so often, that you, no doubt, are familiar with the whole subject. In both the order of creation is the same. First the plants to afford subsistence and then the animals, the chief point of apparent difference being as to the duration of the period between “the evening and the morning.” “A thousand years are in His sight as one day,” and the Mosaic account affords evidence itself that the term “day,” as there used, is not that which comprehends our twenty-four hours. It was a day that had its “evening and morning” before the sun was made.

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Robert Lewis Baty
6105 Southeast 61
Oklahoma City, OK 73135

Reply to Baty Concerning the Views of Matthew Fontaine Maury

First, whether C. L. Lewis quoted the ***Times*** article is, admittedly, a matter of ambiguity. Immediately after Lewis presents an in-text quote, the type size changes and we read the following: “Publisher’s Note: Permission has been granted to print the following portion of Miss Virginia Lee Cox’s description of the Maury Monument soon to be erected in Richmond, Virginia” (p. 251). The article is reprinted in the same type, and includes Miss Cox’s reference to the son’s reading of Psalm 8 (p. 252). Did the publisher add this quote without Lewis’ approval or cognizance? Did Lewis request this quote, for which the book’s publisher had to get permission? But more to the point, does this really make any difference? The fact is this: the broad distribution of Lewis’ biography has ensured the popularity of Cox’s version of this incident.

Second, my article neither explicitly nor implicitly stated anything about Maury’s view on the age of the earth. Nor does the fact that my article was published by ***CRSQ*** imply anything-one way or the other-about any views Maury may have held on the subject, since on occasion within the pages of ***CRSQ*** proponents of old and young earth positions have been discussed without mentioning their particular view on the earth’s age. In submitting my article to this journal, I neither stated nor implied that Maury would have agreed to all the bylaws of the CRS. Interestingly, however, Maury did argue that the dry land appeared on the second day, and that this “account of Revelation” was the same as the “account which Nature has written” (1859, p. 203). Perhaps he took the word “day” to mean something other than 24 hours, but as yet I have not seen any attempt in his writings to reconcile Genesis with evolutionary theories. Maury’s life stands out because of his high regard for both science and Scripture, as my article discussed at length, but this does not mean that I agree necessarily with all his interpretations in either field.

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Trevor J. Major
230 Landmark Dr.
Montgomery, AL 36117

IMPACT EVENTS WITHIN THE YOUNG-EARTH FLOOD MODEL

CARL R. FROEDE JR. AND DON B. DEYOUNG*

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Abstract

Terrestrial impact craters have been identified from the Earth's surface and subsurface. Currently, the most significant subsurface example is the Chicxulub Crater on the Yucatan Peninsula in Mexico. Many uniformitarians propose this impact crater as initiating events which culminated in the demise of ***the dinosaurs at the Cretaceous-Tertiary boundary. We propose, instead, that most Earth cratering events occurred during the Flood Event Timeframe as a result*** of ***impacts with extraterrestrial objects. Impact collisions reached a maximum during the Flood, exponentially decreasing thereafter. We also propose that the collision objects may have originated from the disintegration*** of ***a planet in the region of the asteroid belt.***

Introduction

Critics of the young-earth Flood model have suggested that creation science fails to defend its postulates. It has been suggested that creationists stand on the sidelines with their religious beliefs and malign uniformitarian theories and processes (Berra, 1990, pp. 124-126; Van Till, Young, and Menninga, 1988, p. 44; Godfrey, 1983; Futuyma, 1982, p. 176; Kitcher, 1982, pp. 1-51). Additionally, creationists are often portrayed as failing to suggest alternative theories on scientific issues. However, many of the evolutionary issues under investigation have less to do with science than with interpretation. Most of the uniformitarian historical postulates have little basis for testability or reproduction. They only exist due to the interpretation of physical evidences which exist in the present. One example is found in the occurrence of the platinum group metals (i.e., ruthenium [Ru], rhodium [Rh], palladium [Pd], osmium [Os], iridium [Ir], and platinum [Pt]), shocked-quartz grains, microtektites, and other impact related ejecta at select stratigraphic boundaries within the worldwide evolutionary stratigraphic column.

The common view is that these impact related materials along with their associated impact craters represent cyclical visitations by bolides which resulted in mass-extinction events throughout geologic time (e.g., Cretaceous-Tertiary or K-T, late Eocene, Middle Miocene, and Upper Pliocene) [Orth, 1989, pp. 37-72; Raup and Sepkoski 1984; 1986; Raup, 1992; Sepkoski, 1994]. However, the extinction events, along with the periodicity suggested are still speculative. Clemens (1994, p. 247) has stated that several well-documented impact events are not contemporaneous with times of major or even minor extinctions. The impact events are dated using evolutionary methods (i.e., biostratigraphy and radiometric dating) and are believed to occur in a cyclic rhythm. However, these impact structures along with their associated ejecta can be interpreted in several ways depending on the model (i.e., impactor, volcanist, uniformitarian, or catastrophist) used to explain the physical evidence. Futuyma (1982, pp. 175-176) identifies the K-T boundary as a place where uniformitarians are clearly engaged in the science of testing a scientific hypothesis, specifically the "collision hypothesis."

Figure 1. A Cretaceous-Tertiary (K-T) boundary outcrop, located southeast of Braggs, Lowndes County, Alabama. This specific site is probably the most widely studied K-T boundary site on the Gulf Coastal Plain (see Copeland and Mancini, 1986).

This paper suggests a hypothesis for the formation of impact structures within the same testable limits as those proposed by Uniformitarians. However, our theory will be developed within the constraints of the young-earth Flood model. We believe that the Earth was and still is subject to bombardment by asteroids, meteoroids, and comets. Evidence of these historical impact events can be found in the form of crater structures and associated ejecta which dot the globe (e.g., DeYoung, 1994; Haag, 1992; McCall, 1979; Spearing, 1991, pp. 366-367; Neathery, Bentley, and Lines, 1976; Becker et al., 1994; Monastersky, 1995; Hart et al., 1995). The differences between the young-earth catastrophist view of the impact events and those of the Uniformitarians are in the time frames in which these events occurred (Froede, 1995; Walker, 1994), and of the source for the objects in question. The possible origin and impact of extraterrestrial bolides on the Earth (viewed in some cases as initiating the Flood, or simply as occurring during and/or following the Flood) have been previously discussed by several individuals (e.g., Velikovsky, 1955; Patten, 1966; Morris, 1984; Unfred, 1984; Berlitz, 1987; Parks, 1990; Auldaney, 1992; Spencer, 1992; 1994; von Fange, 1994). More recently, Fischer (1994) has suggested that a giant meteorite impact in the Western Somali Basin of Africa perhaps initiated the break up of the Antediluvian landmass.

The three objects commonly associated with impact craters are asteroids, meteorites, and comets. An ***asteroid*** is one of many thousands of large rocks which circle the Sun, mainly between Mars and Jupiter. The are usually miles in size, and grade into ***meteoroids***

***Carl R. Froede Jr., B.S., PG., 2895 Emerson Lake Drive, Snellville, GA 30278-6644; Don B. DeYoung, Ph.D., Grace College, 200 Seminary Drive, Winona Lake, IN 46590.**

when small, on the order of dust to several feet. Most meteoroids are of dust size. A *meteorite* is any space rock, either asteroid or meteoroid, that impacts a moon or planet. The actual streak of light made when an object passes through the Earth's atmosphere is called a *meteor. Comets* are multi-mile-size objects consisting of dust, rocks, and frozen chemicals. Most orbit in elliptical paths which carry them both near (perihelion) and far (aphelion) from the Sun. For example, Halley's comet travels from within the orbit of Venus, to beyond Neptune's orbit and back again, about every 76 years. A *bolide* is the term for a bright meteor which enters Earth's atmosphere and explodes (Hopkins, 1980, p. 113-114). A glossary of terms is included at the end of this article to aid the reader in understanding some of the specialized words used in this paper.

Dinosaur Extinction

The fact that dinosaurs are no longer found on Earth has fascinated scientists for many years. Many theories have been suggested to account for their death at the close of the uniformitarian Cretaceous Period, specifically marked by the K-T boundary contact. This specific boundary has been discussed and debated for many years in an effort to determine the cause of the K-T mass extinction event(s) (Christensen and Birkelund, 1979). In a monumental paper published in 1980, Alvarez, Alvarez, Asaro, and Michel, suggested that the K-T extinction was caused by a bolide impact. Their paper offered as evidence of this event the occurrence of platinum group metals, specifically iridium, along the K-T boundary from two locations recognized as representing a nearly complete rock transition from the Mesozoic into the Cenozoic, specifically, Gubbio, Italy; and Stevns Klint, Denmark (Alvarez, Alvarez, Asaro, and Michel, 1980; see also Ganapathy, 1980; Russell, 1982; Alvarez, Asaro, and Montanari, 1990). The paper suggested that, based on the concentration of iridium found at the two K-T boundary sites, the asteroid was 6-14 kilometers (3.6-8.4 miles) in diameter. This impact is suggested to have created a number of environmental disasters such as darkness and cold temperatures due to the loss of sunlight, global wildfires and acid rain due to the heat and particulate matter thrown up into the atmosphere, and a global greenhouse effect created as water vapor and carbon dioxide were also released in large volumes in the atmosphere (Evans, 1992, p. 141).

Since the publication of the Alvarez paper there has been a worldwide search for the impact crater(s) associated with the K-T extinction, and also for additional boundaries which indicate significant concentrations of the platinum group metals. Over the ensuing years scientists have found the occurrence of iridium at seven stratigraphic horizons other than the K-T boundary (Raup, 1991a, p. 172; Orth, 1989, pp. 37-72). Iridium has been used as a stratigraphic boundary marker because its occurrence is viewed as indicating a condensed section paleosurface and a place where continuous deposition can be documented (Wang, Chatterton, Attrep, and Orth, 1992, p. 40; Froede, 1994a). Additional information regarding where iridium is found in the uniformitarian stratigraphic column along with its probable origin is provided in Table I. Research is continuing and additional boundaries will probably be added in the future, as scientists further quantify and qualify the platinum group metals along stratigraphic boundaries.

Iridium by itself does not require a bolide impact event to explain its occurrence. Several investigations have now been performed which indicate that iridium can become concentrated due to other causes, described later. Additional evidence must be supplied to clearly link the iridium concentrations to extraterrestrial origin.

In the continuing search for cosmogenic debris and impact rock ejecta associated with the K-T boundary, scientists have identified what is believed to be evidence of wildfires (i.e., soot) which resulted from the impact of the bolide (Wolbach, Lewis, and Anders, 1985; Wolbach, Gilmour, and Anders, 1990). The soot is found interbedded with the iridium at only a few K-T boundary sites; however, it is suggested that this represents a global scale wildfire. Additional support for the occurrence of global wildfires has been based on the change in carbon isotopic ratios across certain K-T boundary sites (Ivany and Salawitch, 1993) and the presence of fullerenes (C_{60}) [Heymann, Chibante, Brooks, Wolbach, and Smalley, 1994]. However, the

Table I.

Geologic Interval	Original Source	General Location
Upper Pliocene (Tertiary)	Bolide	Southeast Pacific
Middle Miocene (Tertiary)	Bolide	South Pacific
Late Eocene (Tertiary)	Bolide	Southeast U.S./Caribbean
K-T boundary	Bolide	Italy, Denmark, U.S.
Cenomanian-Turonian boundary (late Cretaceous)	Sea-floor Spreading	Western U.S. Western Canada
Callovian-Oxfordian boundary (Middle-Upper Jurassic)	Bolide	Spain, Poland
Permian-Triassic boundary (very minor traces)	Weathered volcanics derived from the Earth's Mantle	China, Austria
Frasnian-Famennian boundary (Upper Devonian)	Bioaccumulation	U.S.A., Belgium, Australia, Germany, China
Ordovician-Silurian boundary	Weathering of iridium containing rocks	Czechoslovakia

Table I. Adapted from Raup (1991a, p. 172). Orth (1989, pp. 37-72), Erwin (1993, pp. 248-258), and McGhee (1994). The Tertiary bolide events are believed to support the 26 million year periodicity proposed by Raup and Sepkoski (1984; 1986). Serious questions remain regarding the real versus apparent relevance of iridium to an impact boundary (see Donovan, 1987).

evidence for global wildfires has not been agreed upon by all scientists at this time (Keller and MacLeod, 1993). Additional support for a global K-T impact has been suggested based on the occurrence of shocked-quartz grains found at the various crater sites (Bohor, Modreski, and Foord, 1987).

In 1991, Hildebrand et al., proposed that the Chicxulub Crater, located beneath the upper northwestern edge of the Yucatan Peninsula, Mexico, was the site of the impact event associated with the K-T mass extinction boundary. Additional evidence, beyond the occurrence of shock metamorphism and gravity surveys, was suggested by rock compositional similarities with tektites found in the Caribbean (Hildebrand et al., 1991, p. 870; Koeberl, 1993) and evidence of impact induced tsunami deposits found in nearby deep sea sediments (Alvarez et al., 1992). However, evidence that the Chicxulub Crater was actually formed by impact is still rather scarce (Heide and Wlotzka, 1995, pp. 63-64).

Whether or not the Chicxulub crater is the only impact structure associated with the K-T extinction is still being debated. Recently it has been proposed that multiple impacts bracketed the various extinction boundaries. These meteor/comet showers provide a better explanation for the variation in impact ejecta composition (i.e., granitic versus basaltic) and tend to support the seemingly slow extinction of the terrestrial vertebrates, as found across the globe (Clube and Napier, 1984; Davis, Hut, and Muller, 1984; Alvarez and Muller, 1984: Rampino and Stothers, 1984; Whitmire and Matese, 1985; Hut et al., 1997; Bailey, Clube, and Napier, 1990, p. 397; Glen, 1984a, p. 4: Clube, 1994, p. 155; Glen, 1994b, p. 19). Several impact events associated with the K-T boundary are now suggested as having contributed to the K-T extinction (Koeberl et al., 1990; Koeberl, Sharpton, Murali, and Burke, 1990; Hartung, Kunk, and Anderson, 1990; Monastersky, 1993a, p. 212-213). However, the Chicxulub Crater is currently recognized as the largest impact crater on Earth (i.e., minimum 112 miles in diameter) and is generally agreed upon as the primary impact structure which ultimately resulted in the K-T mass-extinction event (Hildebrand et al., 1991, p. 867; Swisher et al., 1992; Monastersky, 1993b; Monastersky, 1994; Schuraytz, Sharpton, and Marin, 1994; Coccioni and Galeotti, 1994; Kamo and Krogh, 1995). Ahrens and O'Keefe (1983) have suggested that the impact of the 10-kilometer (6.2 mi) bolide would have released almost one million times the energy of the strongest earthquake ever recorded, resulting in an earthquake of about 13 on the Richter scale.

Many scientists still question the worldwide effect that the Chicxulub impact had on the K-T boundary. This is due to the lack of evidence of its direct effect on the fossil or rock record at other exposures of the K-T boundary found around the globe (Elliot, Askin, Kyte, Zinsmeister, 1994; Hsü, 1994; Briggs, 1994; Savrda, 1993; Kerr, 1992; Sheehan and Fastovsky, 1992; MacLeod and Keller, 1991; Kunk, Izett, Haugerud, and Sutter, 1989; Donovan, et al., 1988; Fassett and Rigby, 1987; Buffetaut, 1990; Hallam and Perch-Nielsen, 1990; Longoria and Gamper, 1995; Marshall 1995). Several geologists working in northeastern Mexico have investigated deposits interpreted as being tsunamian in origin, reflecting the Chicxulub impact event. These scientists suggest that the sediments do not indicate tsunami deposition, rather they represent incised valley fill deposits resulting from noncatastrophic depositional conditions (Stinnesbeck et al., 1993). However, this site and its noncatastrophic re-interpretation is still under debate (Smit, Roep, Alvarez, Claeys, and Montanari, 1994).

Another theory has also been suggested to account for the iridium and other materials claimed to represent impact ejecta. This group suggests that volcanoes and volcanic processes associated with both subaerial and subaqueous eruptions can explain these various materials (i.e., iridium, tektites, shock-quartz grains). Additionally, this group suggests extinction events correlate directly to volcanism; however, Vermeij (1995, p. 137) has stated that many of these large scale volcanic events fail to correlate with extinction events. While many of the arguments for this theory are compelling (Vogt, 1972; Officer and Drake, 1985; Courtillot and Besse, 1987; Hallam, 1987; Courtillot, 1990), it would appear that the volcanists are losing ground in explaining all of the physical evidences in support of the impact theory (Harris, Hutchison, and Paul, 1972, pp. 313-314; Bohor, 1990a; Meisel, Krähenbühl, and Nazarov, 1995). Glen (1994b) presents the details of this debate and should be consulted by the reader for further information.

Periodic Collisions

Various extraterrestrial events and their effect on life history as viewed via the stratigraphic record have previously been discussed by several scientists over the years; however, no physical evidences have been presented to support the various theories (Schindewolf, 1963; McLaren, 1970; Urey, 1973). The success of the Alvarez et al. 1980) proposal was based on their ability to present iridium as the physical evidence to support the proposed K-T impact event. Additionally, the Alvarez et al. 1980, p. 1107) proposal predicted a 100 million year (abbreviated 100 Ma) cycle between asteroid collisions in an attempt to unify asteroid impact events with the various extinction event boundaries. Strong arguments have been presented suggesting that large bolide impacts have caused mass-extinctions throughout the uniformitarian stratigraphic record. Several Cenozoic stratigraphic boundaries have been found to contain both cosmogenic and impact-related materials. This prompted Raup and Sepkoski (1984; 1986) to propose a cyclical occurrence of impacts throughout the Cenozoic Era. Their statistical analysis of the periodicity of the impacts suggested the occurrence of cyclic extinctions every 26 Ma for the past 250 Ma, although not all of the data clearly fall within the predicted range (Raup, 1986a, p. 1532; Raup, 1986b, pp. 115-122; Raup, 1991a, p. 164; Raup 1991b; Kerr 1985, p. 1452: Goldsmith, 1985, pp. 61-65). Several scientists (e.g., Clube, 1994, p. 155; Bailey, Clube, and Napier, 1990, pp. 397-401) have suggested that decadal-to-centennial intensifications of the sporadic Taurid meteor flux can account for impact events recorded in Earth history. The source of the crumbling Taurids was created by giant comets, or Chirons, from the Oort cloud that were deflected by Jupiter into sub-Jovian space, where they proceed to break up under the influence of the Sun (Clube, 1994, p. 167). Still others have suggested a 33 Ma periodicity not based on extraterrestrial impacts, but on the extinction events observed in the fossil record (Fischer and Arthur, 1977).

In 1994, the world observed the impact of more than 20 fragments of Comet Shoemaker-Levy 9 onto the planet Jupiter (Cowen, 1994a, p. 55; Levy, Shoemaker, and Shoemaker, 1995). Interesting questions remain following this multiple impact event regarding the size and composition of the material (i.e., comet or asteroid) and its depth of penetration into Jupiter (Cowen, 1994b, p. 133; 1994c, p. 412-414). However, these impacts have served to reinforce the uniformitarian predictions for the periodic bombardment of Earth by bolides from its earliest beginnings to present times (Alper, 1994; McGhee 1994; Glen, 1994, 1994a, p. 38). Some scientists are now suggesting that bolide impact events could be the primary driver behind evolutionary processes (McGhee, 1990, p. 49; Monastersky, 1995, p. 59).

The reader should realize at this point that there is much evidence to support the fact that extraterrestrial objects have impacted the Earth. However, the dating of the impact craters is based on the uniformitarian stratigraphic column, so vast ages are often inferred. DeYoung (1994) presents evidence to suggest that the dating of any impact structure is questionable at best. The evolutionary stratigraphic column is used to support the suggested ages of the various impact structures across the globe and their periodicity, and this concept should be challenged by creationists.

Collision Objects

Originally, asteroids were suggested as the source for the iridium found at the various stratigraphic boundaries (Alvarez et al., 1980, p. 1105). This is because asteroids are thought to be of sufficient size and to contain the metals necessary to result in the accumulation of higher-than-background concentrations of platinum group metals found along select stratigraphic boundaries. Meteorites also contain metals, but are too small to account for the quantities of iridium and other metals found at the many boundaries.

More recently comets have come into the forefront as potential sources of the platinum group metals. This is primarily because comet collisions in the size range necessary to account for the higher-than background concentrations of iridium are thought to occur twice as frequently as asteroid impacts (Alvarez et al., 1980, p. 1107). However, a problem with the comet hypothesis exists in their metal carrying capacity when compared to the more dense asteroids. It would take a 12-kilometer (7.5 mi) comet to bring to Earth the same amount of iridium as a 7-kilometer (4.3 mi) asteroid, assuming the fraction of iridium is the same in both objects (Goldsmith, 1985, p. 104). Additionally, the larger the size of the comet or asteroid, the less statistically likely and fewer in number the impact events become. This is because the large Apollo asteroids and comets are few in number and also are not predicted to be in significant numbers in Earth's past. According to Heide and Wlotzka (1995, p. 64), Apollo asteroids are a special group which cross the Earth's orbit and:

> About 30 of these Apollo asteroids are known (diameters between 0.2 and 8 km [656 ft and 5 miles]); and their actual number is estimated to be between 750 and 1000. [Brackets ours]

The number of known space objects also works against frequent comet collisions with Earth. There are about 1,000 comets identified today. The suggestion of a million additional comets in the distant Oort Cloud is pure conjecture. Meanwhile, the nearby asteroid belt between Mars and Jupiter consists of more than 100,000 asteroids. Asteroids thus appear to be much more likely collision objects than comets. Currently, many astronomers believe that the gravitational force of Jupiter can disturb the orbits of the asteroids such that they cross into the orbital paths of both Mars and Earth (Heide and Wlotzka, 1995). According to Clube (1994, p. 167) the original source of the planet-crossing asteroids was at one time believed to be from the asteroid belt; however, it is now generally held that the extraterrestrial material is derived from the disintegration of giant comets generated from the distant Oort Cloud.

Recently, it has been suggested that the disintegration of large comets, by outgassing or sublimation of ice, could produce asteroid fragments through their break-up and decay (Bailey, Clube, and Napier, 1990, p. 372). Additionally, Bailey, Clube, and Napier (1990, p. 397) have suggested that the Taurid-Arietid meteor stream has been produced in this manner. This theory would then provide a relatively constant source of asteroid and comet objects with which to impact Earth over the suggested billions of years (Ga) of geologic time.

The only probable occurrence of a comet striking the Earth occurred on the night of June 30, 1909 in the Tungus forest in Siberia, Russia. Bailey, Clube, and Napier (1990, p. 399) have suggested that this comet was probably from the Taurid-Arietid meteor stream (again due to the source considerations). Trees were blown down from a central "ground zero" point as far away as 30-40 kilometers (19-25 mi) and people were knocked to the ground over 30 miles away (Brandt, 1981, pp. 86-87). However, no large crater was created because the object was believed to have disintegrated miles above the Earth. Some astronomers still doubt the comet idea for Tungus, Siberia preferring a large exploding meteorite instead (Heide and Wlotzka, 1995, p. 55).

Comet Clouds

Investigations are underway to locate asteroids or comets within the solar system which might collide with Earth in the future, as well as shed light on possible impacts from the past (Shoemaker, Wolfe, and Shoemaker, 1990, p. 155-169). Two comet clouds have been proposed to explain the presence of comets today. The Oort cloud is said to be 10,000-100,000 astronomical units from the sun (1-10 trillion miles), with a second Kuiper belt of comets closer than the Oort cloud. Neither cloud has ever been observed. It is further thought that passing stars occasionally perturb these outer comets into Earth‘s orbital path (Goldsmith, 1985; Raup, 1986b; Muller, 1988). Because such remote comets cannot be detected and would have periodicities which are not within observable limits e.g., 26 Ma vs. 33 Ma vs. 100 Ma) they exist mainly in the minds of the people who propose and follow the uniformitarian model.

Titius-Bode Law**

The distance to the planets, measured outward from the sun, can be estimated from the Titius-Bode law. This 200 year-old relationship is outlined in Table II. Distances are given in astronomical units (AU); the Earth averages one AU, or 150 million kilometers (93 million miles) from the sun. The Titius-Bode law closely predicts the distances to the first seven planets and also to the asteroid belt. Neptune and Pluto diverge from the general rule, perhaps because of past collisions or close encounters with other space objects. The Titius-Bode law is not regarded as a fundamental law of nature. This is because there is no physical reason such as gravity or celestial mechanics which requires the planets to be spaced according to this numerical pattern. However, the law appears too accurate to be merely coincidental. One credible conclusion is that the relationship displays an original, intelligent pattern in the positioning of the planets.

The asteroid belt is also of special interest in that it “fits” with the approximate location of another planet using the Titius-Bode law. Several theories have been suggested to account for the materials which presently form the asteroid belt. One theory suggests that several small planetary bodies actually formed within this orbital path and that they eventually collided and scattered resulting in the generation of orbit crossing asteroids and the asteroid belt (Allègre, 1992, p. 123). Another theory has suggested that an outside object collided with the former planet thus creating the ejecta and the asteroid belt. However, at this time the authors support the explosion of a single large planet composed of rock and ice (i.e., terrestrial, not gaseous like Jupiter). This concept within the young-earth Flood model has previously been suggested by Parks (1990).

Due to causes beyond scientific testability, the hypothetical planet disintegrated, exploded, and sent debris (asteroids and comets-i.e., rock and ice), throughout the solar system. This theory would generate materials whose object size would vary from the microscopic to several miles in diameter. Much of this debris would impact with the planets and moons and evidence would be provided by impact craters. Some of these impacts were tremendous events resulting in the creation of space-entering ejecta. For example, ejecta from both Mars and the Moon are believed to have entered into space and to have later fallen on Earth (Condie, 1989, p. 17; Allègre, 1992, p. 124; Evans, 1992, pp. 134-138; Heide and Wlotzka, 1995, pp. 184-186).

The distance and gravitational pull of the planets and moons would directly effect the number of impacts, with the larger planets and moons having a higher incidence of impacts than the smaller planets and moons. Some debris might also go into large orbits around the solar system. Currently, scientists estimate that over 100,000 asteroids of various sizes exist in the asteroid belt. These asteroids are presently gravitationally locked in place and cannot be moved from their orbital pathway unless gravity or collision provides the energy to free them (Glass, 1982, p. 326).

Current asteroid fragments contained within the asteroid belt would combine to form an object size of about 1500 km (932 mi) in diameter. This is less than half the size of the moon and is also smaller than Pluto. Because of this limited asteroid mass and the lack of a disintegration or explosive mechanism, most astronomers reject the planet-explosion idea for the origin of the asteroid belt. However, we suggest that the original planet was substantially larger than the combination of today’s asteroid belt remnants. This larger-than-present size is based on the summation of the observed asteroid remnants combined with the other planetary ejecta occurring as imprints (i.e., craters) on all the terrestrial planets and satellites within our solar system.

We realize that many impact features which have occurred on the Earth and surrounding planets have probably been erased due to tectonics, flood basalts, ice flows, flood waters, subduction, and erosion. Hence, we are forced to only guess at the original size of the planet in question. Based on the number of impacts and the size of the planet necessary to generate the mass of impact material and resulting asteroid belt, it would appear that the planet would be at minimum the size of Earth. The theory of an exploding or disintegrating planet once existing where the asteroid belt occurs today is not a new idea. Two centuries ago, Heinrich von Olbers described the breakup of a planet between Mars and Jupiter (Marvin, 1986, p. 144).

Creation Model

Young-earth creationists accept the Biblical account of a worldwide Flood. It was a period of time in which high-energy catastrophic processes operated. While the Bible speaks of “stars” (perhaps asteroids, meteors, or comets) falling from the sky in the last days, nothing is mentioned regarding falling stars associated with the Flood event. So we must attempt to interpret the physical record of terrestrial impacts without direct Biblical reference.

As a similar example, the Ice Age is not directly referenced in the Bible, yet we have the physical proof that one existed in Earth’s past. Michael Oard (1990) has proposed a theory which explains the oc-

Table II.

Number sequence	Add 4; Divide by 10	Actual planet distances from sun (AU)	Planet
0	.4	.39	Mercury
3	.7	.72	Venus
6	1.0	1.0	Earth
12	1.6	1.52	Mars
24	2.8	2.8	Asteroids
48	5.2	5.2	Jupiter
96	10.0	9.54	Saturn
192	19.6	19.2	Uranus
384	38.8	30	Neptune
768	77.2	28-50	Pluto

Table II. Planet distances from the Sun as estimated from the Titius-Bode law (column 2) and actual measurements (column 3). Distance measurements are in astronomical units (AU), where one AU equals 150 million kilometers. An AU is the average distance between the Earth and Sun.

Also known as Bode’s law and is a mnemonic device discovered by J.D. Titius in 1766 and advanced by J.E. Bode in 1772, used for remembering the distances of the planets (and asteroid belt) from the Sun (Hopkins, 1980, p. 18; Allaby and Allaby, 1991, p. 378).

currence of a single ice age within the young-earth Flood model to address the physical evidence. The occurrence of meteor craters on and buried within the Earth requires the same type of analysis and model development.

We suggest that the majority of these impacts occurred during the Flood with an exponential decrease afterward. Exact age determination of any impact structure, within the young-earth Flood model, would be dependent upon the types of rocks in which they are found (e.g., igneous and metamorphic shield craters versus sedimentary rock craters) along with the depth and conditions of burial, not based on any paleontology associated with the rocks affected by the impact.

Platinum group metals, specifically iridium, do not themselves suggest an extraterrestrial source. Studies performed by several scientists have shown that iridium can come from a number of sources, including: basaltic lava flows, weathering of mantle derived iridium containing rocks (Bird and Bassett, 1980; Finnegan, Miller, and Zoller, 1990), concentration by biological activity (Orth, 1989, p. 55; Wallace, Keays, and Gostin, 1991), normal cosmic influx at a condensed section (Wang, Chatterton, Attrep, and Orth, 1992), or precipitation due to redox changes in marine chemistry (Colodner, Boyle, Edmond, and Thomson, 1992; Wang, Attrep, and Orth, 1993). However, the fact that shocked quartz grains and tektites are also found associated with some of the suspected impact boundary cosmogenic metals tends to support the occurrence of a meteor impact. The occurrence of extraterrestrial impacts on Earth is not counter to any Biblical teaching.

Rampino (1994; see also Glen, 1994b, p. 34) has called for the reexamination of many Proterozoic glaciated deposits due to their similarity with impact diamictites. He stated that impact ejecta deposits were originally misidentified as being of glacial origin (Rampino, 1994, p. 439). This could explain the lack of any additional glacial features, beyond the occurrence of tillites, for several sites currently accepted as reflecting Proterozoic glaciation. Rampino (1994, pp. 449-450) has correlated several mass-extinction boundaries with known "glacial" episodes which, based on evidence to support its impact origin, could more easily be explained within the framework of impact extinction events. Hence this impact versus glacial determination could potentially affect various Paleozoic climatological models and plate tectonic links between the continents (e.g., South America, Africa, Antarctica, India, and Australia).

The Flood Timeframe

The Flood caused a worldwide redistribution of previously existing crustal materials along with additional material added through volcanic and cosmogenic sources. Ecological communities were decimated during this event with some probably being buried in their original environment (i.e., in situ). If these communities were within an impact area, then cosmogenic debris could be added in the form of overlying sediments. The deposition of subsequent sediments, above the previously deposited impact materials, would then serve to preserve the debris until the rock section was later examined. Hence, communities buried in situ and covered over by a thin layer of cosmogenic and impact related ejecta would give the appearance of a mass-extinction event via a bolide impact. A suggested creationist position regarding the meaning and relevance of the iridium layer to the K-T boundary has previously been discussed (Oard, 1993; 1994; Auldaney, 1994; Froede, 1994b).

During the Flood event, impact structures would remain intact if they occurred in areas of either nonerosion or in basins where they would become buried and preserved. However, all records of impact structures could be obliterated if the structure occurred in an area subject to erosion. Many of the structures observed in various sedimentary rocks exposed at the Earth's surface appear to be recent and would suggest their post-Flood formation during the Ice Age to Present Age Timeframes (such as the Arizona Meteor Crater).

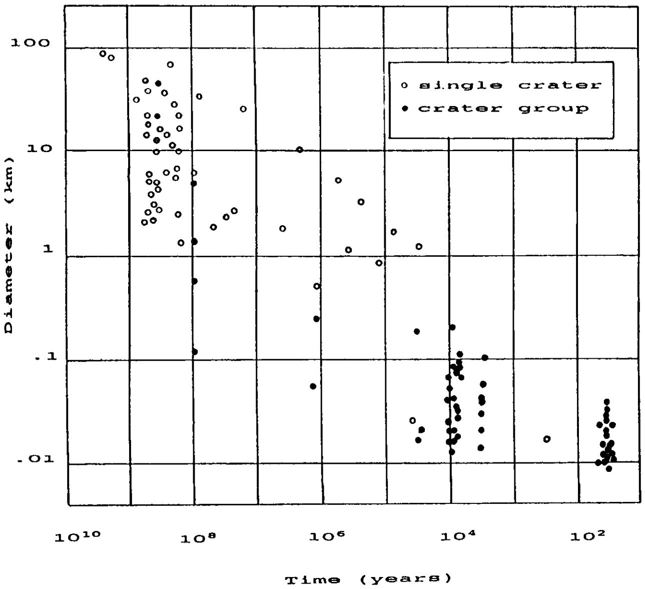

Figure 2. A log-log graph of earth impacts. Collision object size (vertical axis) is plotted against uniformitarian time (horizontal axis). The timescale is relative, and may well reflect the Flood Event through Ice Age Timeframes, with greatest bombardment activity occurring during the Flood.

Figure 2 summarizes impact collisions during Earth history (Andes, 1995). This log-log plot shows an exponential decrease of object size with time. The uniformitarian timescale shown is entirely relative. It is interesting to interpret this graph from the young-earth creationist viewpoint. The young-earth Flood model would suggest the frequency of collision with large objects as peaking during the Flood event, and decreasing exponentially thereafter. The rapid decrease in the numbers of impact events indicates that there are no new major sources of asteroids. While occasional impacts continue today, these collisions are a mere remnant of earlier activity. This same concept of increased impact activity during the uniformitarian Phanerozoic equivalent to the Lower to Middle Flood Event Timeframe) has been recognized and suggested by Shoemaker (1984). However, others view bombardment as exponentially decreasing since the formation of the Earth approximately 4.5 Ga ago (Allègre, 1992, p. 113).

The impact structure associated wit the K-T boundary at Chicxulub, Mexico is found approximately 3650 feet below the present land surface (Hildebrand et al., 1991, pp. 868-869). Because of its depth and condition of burial it probably represents a time of impact during the Lower to Middle Flood Event Timeframe. We suggest that this period of time probably followed global precipitation, when plate spreading may have occurred and waters were moved about by winds. The Flood waters had not yet started their initial withdrawal from the land. During this period of time, water currents generated by wind and tectonic movement served to erode and redeposit sediments across the globe. Impact events which occurred during this period would strike the Flood waters and penetrate into the soft or semi-lithified sediments. This would result in the blasted impact altered sedimentary debris spreading far across the area. Some scientists currently view the Chicxulub Crater as having formed within a shallow marine setting in this manner (Glen, 1994b, p. 15). Sedimentation would continue as erosional forces served to redistribute materials around the globe. Impact sites which occurred in soft newly deposited sediments and the debris from those impacts would either be buried and preserved or eroded, reworked, and deposited wherever the currents transported them. This is suggested by the distribution of impact craters and their associated ejecta found at several sites, and at various stratigraphic boundaries, around the world (Bohor et al., 1987; Bice, Newton, McCauley, Reiners, McRoberts, 1992; Hodych and Dunning, 1992; McGhee, 1994; Schultz et al., 1994; Poag and Aubry, 1995).

The record of extraterrestrial impact events is preserved at only certain localities and is extrapolated (using the uniformitarian stratigraphic column-a "global" rock record) to suggest worldwide conditions. The fact that these impact events occurred during the cataclysmic worldwide Flood event would be reflected throughout the uniformitarian rock record. The would occur in rocks identified from the Earth's earliest beginnings (represented by "Precambrian" age rock) to "modern" impact structures such as that of the Arizona Meteor Crater (possibly dated to the close of the Ice Age or even later, due to the minor erosion observed at this site [DeYoung, 1994]). (Figure 3).

We suggest that the majority of the uniformitarian stratigraphic record represents sediments deposited on a worldwide scale during the Flood. If the majority of the impact structures date to the Flood Event Timeframe, then it is likely that the resulting impact deposits would occur at specific locations throughout the stratigraphic record. The concentrated cosmogenic layers would indicate areas where impact structures occurred with burial resulting in their preservation. Impact site location would directly correlate to the occurrence of shocked quartz grains and tektites. These materials would be concentrated in areas near impact structures and their preservation would decrease in direct proportion to the distance from the original structure, especially if it were in an erosive area. The occurrence of soot with the cosmogenic debris would only suggest that smoke was in the air and that some level of soot was deposited along with the impact ejecta and associated platinum group metals i.e., iridium). Bolides striking floating or sunken woody materials during the proposed timeframe (Lower to Middle Flood Event) could have resulted in the explosive occurrence of fire and soot. Some of the soot could then have been deposited on the Flood waters until it was buried under additional sediments. The fact that the soot is only found at a few of the K-T sites worldwide would limit the size of the proposed fires. The young-earth Flood model would predict that impact events would only be recognized-within a localized area, because of the erosive conditions which occurred during the Flood. The local impact effect is supported by the physical evidence found to date. Thus, the physical evidences necessary to support impact events for each of the various stratigraphic layers (i.e., K-T, late Eocene, Middle Miocene, and Upper Pliocene) are not always recognized in rocks the same age (i.e., chronostratigraphically across the global. Additionally, it has been suggested that some layers have been improperly identified as having multiple ejecta layering (thus-suggesting multiple comet showers) due to the lateral spread of the impact-generated microspherule debris (Wei, 1995). Bailey, Clube, and Napier (1990, p. 375-376) have stated that other than at the K-T boundary, iridium levels (along with impact craters) do not appear to support comet "showers" which have been suggested as having occurred over the past 33-67 Ma. Thus we note the fine-tuning still being performed as scientists attempt to explain the physical evidences and their link to extinction events across certain stratigraphic boundaries.

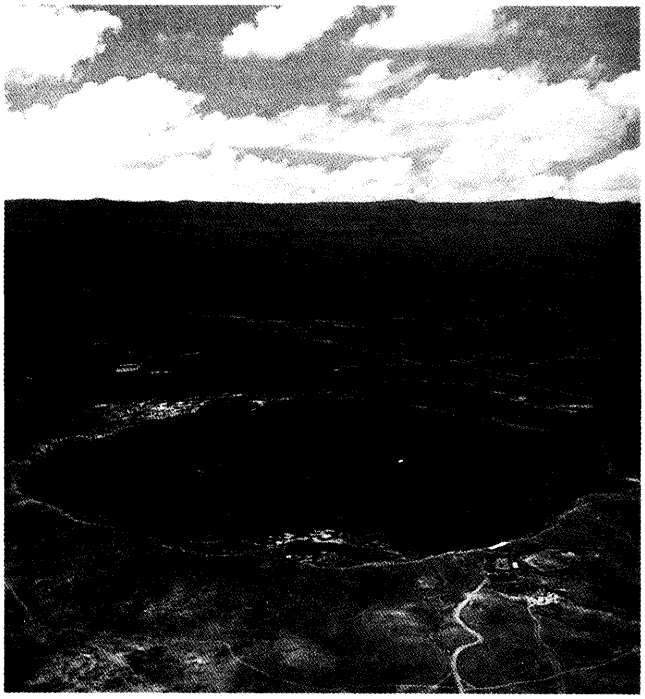

Figure 3. The Arizona Meteor Crater. Note the fresh, uneroded nature of this crater, which suggests its formation following the Flood, possibly during the closing stages of the Ice Age (Upper Ice Age Timeframe), but probably in even more recent times Lower Present Timeframe).

The spacing of the impact craters across Earth's surface during the Flood would place them in different strata (both paleontologic and lithologic). These differences when viewed from the uniformitarian model would place the impact events within different "dated" strata. This may explain why uniformitarian scientists view the different periods of impact events at specific boundaries and locations in Earth's past. By using the evolutionary model developed on evolutionary paleontology (i.e., first and last occurrences of flora and fauna) and stratigraphic position, they observe a periodicity to the impact events. Where impacts occurred in equivalent "dated" strata they would appear to support a comet shower. Luck and Turekian (1983) have noted a difference in osmium concentrations between two K-T sites, which suggests that different meteorites were involved.

These various impact event beds could also offer the young-earth Flood modeler a means of correlating localized areas or even regions in terms of chronostratigraphy. Only through additional detailed studies can the importance of these impact event beds be determined within the young-earth Flood model.

Time Of Explosion

In order to project the input of extraterrestrial material into the Flood Event and Ice Age Timeframes, we need to propose both when and how it could have occurred. We must start with the original planetary disintegration and explosive event and approximate its average travel time to Earth. No mechanism is presently known by which we can predict the cause(s) for the destruction of a planet, resulting in the generation of ejecta (i.e., asteroids and comets) and the formation of the asteroid belt. We acknowledge that the Flood was a single event of Divine initiation and any attempt to understand the original cause is only speculation. Additionally, we suggest that cratering primarily occurred during the Flood Event Timeframe. However, we do not suggest that asteroids or comets were the ultimate cause of the Flood event. The cause of Divinely initiated actions cannot be determined, but we can possibly explain the resulting actions, in this case the asteroid/comet input into the Flood.

The average distance from the center of the asteroid belt to the Earth is 170 million miles. Speed of ejecta moving in a direct path toward Earth might be 15 miles per second, typical meteorite speed. This could place the arrival of extraterrestrial material within 131 days following the proposed planetary breakup. The authors can only speculate when the extraterrestrial material reached Earth's surface, during the year-long Flood. We suggest that the first occurrence of extraterrestrial impacts coincided with the beginning of the Flood. This theory would then require the planet's disintegration and subsequent explosion some 4-5 months before the onset of the Flood event. Any narrowing of this time would require knowledge of the actual positions of the Earth and the original planet, and the speed of its ejecta.

The cause of this planetary disintegration and subsequent explosion is unknown. As a similar example, we do not know what initiated the breaking of the fountains of the deep (Genesis 7:11), but we are told that it happened and we have oceanic rift margins which appear to support this fact. Any attempt to explain the cause of the planetary explosion remains a matter of conjecture.

Asteroids and meteoroids might also have contributed to the collapse of the vapor canopy, if one was present, and aided in the "breaking up of the fountains of the deep." However, the authors are not attempting to explain the Flood event by using the explosion of the planet in question. Rather, we are only formulating a source for the impact craters on Earth along with materials which are also of extraterrestrial origin.

Because this planetary explosion was a one time event it is not repeatable and the testability of this theory is limited to the same physical evidences used by uniformitarians for their proposed impact hypothesis. However, this event does work within the short time frame and duration proposed for the Flood and Ice Age. Debris from this explosion would rapidly be swept up as the planets and moons captured the material which crossed the various orbital paths, as it traveled across the solar system. Anything not captured by gravity probably continued into space or developed elongated orbits around the Sun.

Discussion

We suggest that a disintegrating/exploding planet located in an orbital path between Mars and Jupiter could provide a catastrophic yet limited supply of asteroid and comet material with which to bombard not only Earth but all of the planets and moons in the Solar System. These impact events occurred mainly during the Flood Event Timeframe and exponentially decreased thereafter. Today, the asteroid belt continues to undergo perturbations from nearby Jupiter, resulting in the release of asteroids which occasionally cross into Earth's orbital path. Asteroids continue to impact Earth, albeit in fewer numbers than in Earth's past.

However, we have not solved a number of issues in proposing this planetary explosion event. For example, when was the actual time of the planet explosion? Could it possibly have occurred at the Fall of man? Massive impact events are not recorded in the Bible during the Antediluvian Timeframe. Is this because none occurred during this period or because it was not considered important to the issues associated with the depravity of man before the Flood event? The authors suggest that the impact events are best correlated with the Flood with a rapid decrease in impact events immediately thereafter, based on our interpretation of the evidence. Many other interpretations are certainly possible.

Another issue is the cratering seen on the other planets (Mercury, Venus, Earth, Mars), and moons (those of the Earth, Mars, Jupiter, and Saturn) of the Solar System. Were there any original craters associated with creation or are the craters the result of impacts associated with the proposed planetary disintegration and subsequent explosion? We suggest that most of the cratering seen on the planets and moons is a result of impact events associated with the Flood Event Timeframe. This is because many of the Earth's craters are preserved in the sediments associated with the worldwide Flood. If the planets and moons were created (Day 4) with impact structures already on their surface, then any craters originally on Earth probably would have been obliterated during the Flood event.

Another point of interest in developing the asteroid impact hypothesis is that much of the evidence used to support the impact hypothesis is also believed to support a volcanic extinction hypothesis (Glen, 1994b, pp. 29-33). While the majority opinion among scientists appears to support the asteroid impact hypothesis, there are a number of scientists who support volcanism as the main extinction event driver (e.g., Erwin and Vogel, 1992; Officer and Drake, 1989; Officer and Carter, 1991: Glen, 1994b, pp. 29-33). This is further complicated when viewed within the framework of a repeatable extinction cycle, as was originally proposed by a number of previously cited scientists. The issue of extraterrestrial versus volcanic input into the stratigraphic record, during the Flood Event Timeframe, has not been resolved among young-earth creationists.

Currently, the young-earth Flood model does not have all of the answers to the impact hypothesis and much research and field work remain to be performed. However, this proposed impact model does satisfy the time frames suggested by the young-earth Flood model and would provide the same physical evidences (e.g., cratering on the planets and moons, platinum group metals, impact ejecta, shock quartz, and tektites).

Glossary

Apollo asteroids- Asteroids with elongated orbits that cross the Earth's orbit. Most Apollo asteroids have highly elliptical orbits that extend to the vicinity of the asteroid belt, or in some cases, beyond (Glass, 1982, p. 328).

Asteroid- One of the many small celestial bodies in orbit around the Sun. Most asteroid orbits are between those of Mars and Jupiter.

Bolide- A large meteor that explodes in passing through the Earth's atmosphere (Allaby and Allaby, 1991, p. 44).

Chirons- Used here to describe any number of slow moving minor planets (i.e., large asteroids) which cross the various orbital paths of the planets.

Comet- A small cold object that travels around the Sun, usually in an eccentric orbit. Short-period comets have orbital periods of less than 150 years. Others have very long periods, some exceeding 100,000 years.

Condensed Section- A facies consisting of thin marine beds of sediments deposited during the time of regional transgression of the shoreline (Van Wagoner et al., 1988, p. 44). This particular facies is commonly associated with the buildup of sediments which are enriched in authigenic minerals, volcaniclastics, and cosmogenic debris (see MacLeod and Keller, 1991). See Froede (1994a) for information regarding the concepts of sequence stratigraphy within the young-earth Flood model.

Cosmogenic debris- Sedimentary materials which were derived from extraterrestrial sources.

Diamictite- A comprehensive, nongenetic term for a nonsorted or poorly sorted, noncalcareous, terrigenous sedimentary rock that contains a wide range of particle sizes, such as a rock with sand and/or larger particles in a muddy matrix (Bates and Jackson, 1987, p. 180).

Facies- The aspect, appearance, and characteristics of a rock unit, usually reflecting the conditions of its origin (Bates and Jackson, 1987, p. 232). It can be singular or plural depending upon its usage.

Ga- Geological abbreviation for "billions of years." Term actually represents Giga-annum (10^9 years).

Meteor- Any physical object or relatively small fragment of solid material made luminous as a result of friction during its passage through the Earth's atmosphere.

Shocked Quartz Grains- Quartz grains bearing multiple sets of planar deformation features. These features are recognized as forming at high pressures during loading experiments, and at nuclear detonation sites and impact craters (Bohor, 1990b, p. 336).

Tektites- A rounded, pitted jet-black to green-yellow body of silicate glass of nonvolcanic origin, usually walnut sized, found in groups in several widely separated areas of the Earth's surface and generally bearing no relation to the associated geologic formations (Bates and Jackson, 1987, p. 676).

Tillite- A consolidated or indurated sedimentary rock formed by lithification of glacially derived unsorted an unstratified drift (Bates and Jackson, 1987, p. 688).

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LETTERS TO THE EDITOR

Deceitfulness And The Appearance of Age

I enjoy very much the C.R.S. Quarterly and found myself concerned over Dr. Hugh Ross's statements about "the deceitfulness of God" which were noted in reviews of his book written by DeYoung and Faulkner for the March 1995 and June 1995 issues respectively. He argues that God would be deceitful if He should make a universe with the appearance of age or that implies the existence of things that never truly existed. His point, if true, would be a very important one and Faulkner was completely correct that Ross has "fired a shot across our bow with this book" because obviously we do not believe God to lie nor to be deceptive (from Titus 1:2 "God who cannot lie . . ." and Hebrews 6:18 "it is impossible for God to lie"). We would be guilty of a grave heresy if we accepted that He were. But on closer examination I believe Dr. Ross's argument itself to be untenable to anyone who accepts the Bible as an authority and who does not deny miracles.

Theologians have stated that "creation is, of course, breaking into a circle," meaning that since all parts of creation interact and seem to move in cycles through time, any creation must necessarily include choosing some starting point that seems to have many actions leading up to it like a point on the arc of the circle rather than just a point on a line. Dr. Ross would apparently argue that God cannot "break into a circle" without deceiving an observer into thinking that other things came before.

However, God is not being deceptive if He tells us by special revelation what we might not know by examining natural revelation. God essentially says, "Looking at this you might think of several interpretations, but I am telling you which interpretation is correct? For a Christian, special revelation must take precedence over our interpretation of natural revelation. Creation is not the only case of this, but several miracles could be thought to be deceptive on the same grounds if the Bible did not explain them.

DeYoung quotes Dr. Ross which shows he does not consider the water turned into wine as a counter example to his argument. Yet the miracle is certainly an example of a sudden appearance of something that would normally imply the existence of grapes and vines since eye witnesses explain that it really was water before Jesus acted, and wine afterwards.

In the feeding of the 5,000 and the 4,000, we could say that Jesus was deceitful because someone examining the crumbs left over would be assured of the existence of fish and wheat plants that never truly swam or grew since 12 baskets remained from two fish and five loaves. Yet the Bible explains their existence as an act of Jesus which we accept as evidence of His deity. The disciples give no sign of being deceived but rather seem to have felt that Jesus was giving them important information or evidence for very important true matters.

We should also consider healing miracles, and those whom Jesus raised from the dead. Would a blood test of Lazarus or Jairus's daughter minutes after their resurrection not deceive a doctor into thinking that they had been healthy for days? It would seem that new life in a dead body requires the sudden appearance of some hormones or enzymes that would have disappeared at death. At the very least, Jesus must have rearranged the atoms already present to recreate the dynamic equilibrium of a living body. Similarly, if a test, minutes after a healing, could not show any sign of illness which would be present in a sick body, was Jesus being deceptive? Or was He simply showing His power? If miracles like these were random and purposeless, we would have to distrust what we consider "laws of the universe." But in Jesus' hands the miracles have important educational value as proof of His power, His love for people, and the value of listening to His words. These miracles never have been considered deceptive.

Dr. Ross certainly takes an evangelical viewpoint, but he may have shot himself in the foot using this "deceitfulness" argument because the Bible's presentation of Jesus Himself could be considered deceptive. Isaiah 53 says "And when we shall see him, there is no beauty that we should desire him." We could argue from this that people were deceived because it was not obvious the Messiah was special. Jesus' virgin birth is open to being deceptive because people would postulate a human father who never existed. Nevertheless, thousands of people have accepted that doctrine as truth for the simple fact that they have scriptural warrant to believe it. We do not need to change doctrine simply because someone who does not accept the Bible feels that some facts are open to other interpretations.

If miracles seem deceptive, we need to examine our logic. The point of signs and miracles is that they be out of the ordinary. If we require that miracles follow normal schemes of development they are no longer miracles. Creation is a mighty miracle.

Reviewer Faulkner rightly shows that no one today seriously holds the view that fossils were created in situ in their rocks. But creationists are not required to say that the trees around Adam and Eve were white on the inside like potatoes having no rings to give an appearance of age. (Would palm trees have to be ankle height?). It would seem that God could be open to the charge of being deceptive if he confronted Adam with a creation in which nothing contained hints about how it worked or what should come next. At the very least, creationists should be allowed to develop models of what "appearance of age" would be necessary and sufficient at creation without needing to state that no appearance of age is possible.

The deception argument actually works against those who hold to a theistic evolution position. In using it, they side with scientists who say we must only examine natural evidence without examining special revelation, or that our interpretation of nature takes priority over any Biblical text. Yet this argument would be ridiculous applied to the person and miracles of Jesus. Special revelation found in the Bible is sufficient to prove God's veracity for anyone who accepts it. Dr. Ross may have slipped into the evolutionist frame of reference of presuming that our human interpretation of nature takes priority over any Biblical text, but has forgotten that Biblical authority also is a Christian doctrine.

John Baab
Caixa Postal 7002-Pituba
41.811-970 Salvador, Bahia
Brazil

Retired Geologist Believes in Biblical Inerrancy

I am 79 years old. How can I, a mere layman, convince men with Doctors of Theology and Doctors of Divinity, who may be theistic evolutionists, that the Bible-the original Bible-is God's inerrant Word?

In 1934, I enrolled in Northern Illinois Teachers' College mainly to throw the javelin. I set a record, 210 feet, 11 inches (64.287 meters), that was not broken for 37 years. At Northern Illinois I became sure that evolution was the only way to interpret all the intricacies of comparative anatomy, embryology, genetics, zoology, botany, astronomy, developmental psychology, and all the sciences. Dr. Montgomery, my botany professor, was an evolutionary Methodist Sunday School teacher.

After I graduated in 1940, with a double major in zoology and botany, my brother, Karl, challenged me to re-read my college science books; he asked me to look for real evidence to support evolutionary reasoning.

Then Pastor Harold Kramer, LaGrange, Illinois, loaned me two books: *The Greatest Story Ever Told* and *The Greatest Life Ever Lived.* The precise continuity between the Old and New Testaments deeply impressed me.

Then, when at Luther Institute, in Chicago, two books strongly impressed me. *Scripture Cannot Be Broken* by Theodore Engelder and *Christian Dogmatics* by John T. Mueller. These books had a powerful influence on my way of thinking.

But, all the while I was afraid . . . afraid that somewhere. . . sometime . . . something would be announced from somewhere in the WORLD that evolution was proved true . . .

However, in my own research, I found time and time again that evolution was "inferred" . . . "supposed" . . . "extrapolated" . . . but never precisely proven.

It was not until I began my work on my Master's Thesis and degree in Geology in 1966 at Northern Illinois University, DeKalb, that things began to gel. Four instructors with Ph.D.'s many times challenged UNIFORMITARIANISM for many explanations for observations of Geomorphology, Field Geology, Earth Science for Public School Teachers, and even Historical Geology. At this time I was teaching geology at Spoon River College, Canton, Illinois.

Then in my own research, when I displayed species out of geological order, Dr. Malcolm Weiss, Department Head, told me in front of my advisors, Dr. Frost and Dr. Odom: "Walter, in spite of what the *Treatise of Invertebrate Paleontology,* textbooks, magazine articles, newspapers, radio, or television programs say . . . the last word in geology is what you find in the rocks."

My Master's Thesis research on the plants and animals in the black, fissile shale of the lower upper Pennsylvanian Period directly above the Springfield Number 5 Coal seam was granted in 1970. In it I reported a new Conodont species *(Metalonchodina magnidentatus peters);* the mineral wilkeite, an intermediate calcium phosphate, Apatite, in the light gray interlayer in the distorted lowermost layer of Member 98, using a Fisher-Norelco, water-cooled x-ray diffractometer, Model 2500; the proper scale to x-ray the imbedded fossil elements, some still imbedded and identifiable; and 10 fossils completely out of geological sequence.

In 1991 some unknown person nominated me to have my biography included in the volume, *Who's Who in Science and Engineering.* They published the biography on page 636 of the 1992-1993 volume among 152 other geologists.

In 1993 the International Biographical Centre of Birmingham, England, invited me to submit my biography to *Men of Achievement.* It was published in 1994. And now the American Biographical Institute of Raleigh, North Carolina, has invited me to submit my biography for publication in their 1996 edition, *Five Thousand Personalities of the World.*

And now, 1995, I have finished identifying and labelling 1535 rocks, minerals, and fossils for the "Museum in my Garage." These are arranged from the Archeozoic to the Present, with three by five and four by six cards to correlate geological and Bible history. They were collected from eight Provinces in Canada and 44 States of the United States, during a span of over 30 years with my wife, Dorothy, at my side.

I believe, on the basis of my research, reading, and editing over 100 articles since 1968, that the Bible is God's Holy, inerrant Word . . . and that the Aramaic Peshitta version, translated by George Lamsa, which Martin Luther may not even have known existed at his time, is even more exact than any version we have today.

My prayer, for Christian churches today, is that they will strongly endorse creationism, refute evolution of any kind, and that theistic evolutionists respectfully regard the scientific evidence brought out by the *Creation Research Society Quarterly*, initiated by Walter Lammerts, a Lutheran geneticist. I am a lay member of Christ Lutheran Church, Paris, Tennessee, Pastor Dwain Sliger, minister of my Congregation.

Walter G. Peters*
Springville, TN

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*Editorial Comment: Walter Peters passed away September 8, 1995 from a heart attack. This letter was received September 5, 1995. Mr. Peters has published the following classic articles in *CRSQ:*

Peters, W. G. 1971. The cyclical black shales. *CRSQ* 7:193-200.

__________ 1973. Field evidence for rapid sedimentation. *CRSQ* 10:89-96.

Also, his thesis was:

Peters, W. G. 1970. A paleoecological study of Pennsylvanian black shales using radiographic and photographic techniques. Unpublished master's thesis. Northern Illinois University. DeKalb. 130 pp.

BOOK REVIEWS

The Fossil Trail: How We Know What We Think We Know about Human Evolution by Ian Tattersall. 1995. Oxford University Press. New York. 276 pages. $25.00.

Reviewed by Kevin P. Peil*

Paleontologists and economists have much in common. They are the only two professions where one can be wrong all of the time and still be considered an expert. Popular books on each subject abound with good ones difficult to find. Ian Tattersall (head of the Anthropology Department at the American Museum of Natural History) has succeeded in giving us an original, highly entertaining and educational look at the fossil record of humans.

Tattersall focuses mainly on the historical development of human evolution theory. His main thesis is how preconceptions have shaped our current interpretations of the human fossil record. Tattersall writes:

> . . . how you read your evidence is at least partly conditioned by what you are expecting to find; and in the science of paleoanthropology preconception may well have played an even larger role than in most other sciences [preface, page v].

Tattersall writes that this is due mainly to the "woeful" nature of the human fossil record.

> "Paleoanthropology is unique among the subdisciplines of paleontology in ascribing an almost iconic significance to each new fossil that appears. Rarely do paleontologists working in other groups of organisms feel it necessary to undertake wholesale overhauls of their beliefs every time new fossil members of these groups come to light [page 51].

The book is divided into 17 chapters with an almost excessive portion of the book dedicated to the Neanderthals. The historical setting behind every major human fossil discovery over the last 100 years is examined. The only major shortfall of the book is the minor coverage of the *Australopithecus* finds. One leaves the book with the impression that the *Australopithecus* fossils have played a minor role in the historical development of the theory of human evolution. However, excellent fossil drawings abound with the actual fossils and reconstructions clearly distinguished.

We meet all the major players from Darwin to Dart and Lamarck to the Leakey family. I enjoyed the "insider" comments Tattersall provided giving rare historical insights and introducing vivid personalities. We read of Andrew Hill diving to the ground to avoid a lump of elephant dung thrown by a colleague only to discover the famous footprints at Laetoli, Tanzania [page 148]. We are introduced to a German entomologist named Kattwinkel who allegedly discovered Olduvai Gorge in 1911 when he almost fell into it as he chased butterflies across the Serengeti [page 81].

Tattersall's approach is unique and "opinionated" (to quote the cover of the book and one that most students of human evolution will enjoy reading. Tattersall closes his book with the comment that if the entire human fossil record were to be discovered tomorrow that a "range of interpretations would emerge that is very different from those on offer now" [page 227]. Preconceptions and prejudices are the rule in this particular science. I highly recommend this book to every student of creation.

Fingerprints of the Gods by Graham Hancock. 1995. Crown Publishers. New York. 578 pages. $27.50.

Reviewed by Kevin P. Peil*

I live on 2.5 acres of land. The exact dimensions of my property are 170' by 660' or 112,200 square feet. My parents live on a piece of land that has dimensions of 205' by 175' or 35,875 square feet. If you calculate the ratio of the areas of the two pieces of property you get 112,200/35,875 or 3.13; a number very close to pi. You must marvel at the planning our families have placed in purchasing land in order to pass down to future generations that all too easily forgotten number we call pi. We could easily have chosen to carve pi = 3.14 into a large rock and pass the rock to future generations but the land area calculation will impress them more.

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*4636 Eight Mile Road, Auburn, MI 48611.

*4636 Eight Mile Road, Auburn, MI 48611.

I am sure no one took the above paragraph seriously. Graham Hancock would have made it into a 30 page chapter in his book *Fingerprints of the Gods.* Hancock's thesis is that long ago, most likely between 13,000 BC and 10,000 BC, a civilization flourished on the continent of Antarctica that was as technologically advanced as today's civilization. They had electric power, fast transportation and even airplanes. This advanced civilization, he claims, perished because the last ice age caught them by surprise. I guess they were not advanced enough to have meteorologists.

Hancock has a lot of fun with numbers. He marvels at the many ancient monuments in Egypt, Mexico and South America and the mathematical constants present (including pi) in the dimensions of most of the structures. Although with enough numbers to play with I am sure cosmic results can be obtained from anywhere. Hancock even shows that the three great pyramids of Egypt are aligned in such a way to symbolize the three bright stars in Orion's belt. A glance at a current map of Texas shows the cities of Dallas, San Antonio and Austin to have a similar arrangement [de Camp, 1995].

Hancock is amazed at the number of flood legends that abound with their common thread of only a small remnant of human civilization surviving. He attributes this to an ancient imprint on our minds left by this vanishing civilization as it struggled to survive the onslaught of the ice. Hancock fails to consider that maybe, just maybe, all these flood legends abound because there really was a global flood at one time.

Altogether, I can only recommend this book to readers of science fiction. At times I did find the book rather entertaining and at a few points even laughed out loud (although I am sure Hancock did not intend any parts of the book to be amusing). Do not waste your time.

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Sprague de Camp, L. 1995. Fantastic archeology. *Nature* 376:29-30.

*God's Own Scientists: Creationists in a Secular World** by Christopher P. Tourney. 1994. Rutgers University Press. New Brunswick. 290 pages. Paper $15.00. Cloth $45.00.

Reviewed by Wes Harrison**

The Chronicle of Higher Education, the nation's leading publication dealing with the world of Academe, presented this book in its small but eye-catching multicolored "Nota Bene" focus in the book review section; a rather prestigious recognition considering that only a few publications are so featured among the hundreds of other "books of note" the *Chronicle* mentions over a year's time (1994). Along with Ron Numbers' widely acclaimed work, *The Creationists,* Tourney taps into the continuing and growing interest the academic world has with the evolutionist / creationist dialogue / debate. Additional notice was given to Tourney's work through an adaptation he wrote for *Natural History*. It will become an oft cited work (much as Numbers' book has), especially when the creationist movement is dealt with outside the concerns of scientific detail.

Similar to Numbers' historical approach, Tourney adapts his Ph.D. dissertation of a few years earlier into an analysis of the creationist movement from an anthropological rather than a scientific perspective; that is, he gives only very slight attention to detailed scientific arguments. He built his research around a case study of a creationist group in North Carolina with whom he met periodically over a few years. From this experience he largely extrapolated a much expanded interpretation of what he believes is the primary motivation behind the movement known as creation-science or creationism:

> In summary, I argue that, in order to appreciate why creationism moves people as deeply as it does, one must see it as a body of existential questions and answers-"cultural systems of meaning," in the language of anthropology-about realities, anxieties, uncertainties, and changes in U. S. life in our time (p. 8).

According to Tourney, the concerns that energize the movement are far more cultural (religious, moral) and historical than scientific. Much of the text is given to a historical survey of the cultural changes in American society and how these changes have affected conservative Protestantism. In essence, the creationist movement is an effort to restore to modern society the American Protestantism of a century ago which had "sanctified science" within a biblical worldview, endowing science with a "secular grace." Nineteenth century American Protestantism had united in one worldview a harmonious, biblically moral cosmology that explained all "realities" and satisfied all "anxieties, uncertainties and changes in U. S. life." The incipient secularization of the later nineteenth and early twentieth centuries began to undermine this cosmological harmony, particularly through an expanding "scientific authoritarianism." Science became the "know-all, do-all" of modern culture and in some ways evolution became its most popular expression. The subsequent rise and reign of evolution in academic and scientific circles created a crisis for the unaccommodating Protestant community (fundamentalists). This great secularization began to eat away at the American moral cosmology whose root cause many fundamentalists began to lay at the feet of evolution. Thus the attack on evolution provided a convenient and immediate cause around which they could rally often otherwise disparate forces in their crusade to restore to American society the biblical morality of an age past. The attack on evolution was and remains primarily an avenue to a higher moral objective.

However, Tourney continues, since science had developed such an aura of respectability and authority ("plenary authority") in modern society, it was perceived necessary by creationists to coopt this authority for their position. Thus the biblical explanation of origins had to be expressed in scientific terms to be marketable for sale to modern American culture:

> They [leaders of American creationism] know that, with a secular religion called science coexisting alongside the nation's Judeo-Christian creeds,

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*Editor's note: This book was also reviewed in 1995 in *CRSQ* 32(2):115-116.

**Alderson-Broaddus College, Philippi, WV 26416.

> nothing-not even the Holy Bible-can be credible to the public if it is thought to contradict the mysterious authority of modern science (p. 258).

Further, by emphasizing the scientific data supporting creationism (design rather than evolution's randomness, the fossil record, thermodynamics, among others, though these receive only passing mention) an removing all direct references to Scripture, many in the movement felt that they could make a legal demand for equal treatment with evolution in public school textbooks and classrooms. Through these channels moral restoration could be brought back into the classrooms of America on a "scientific" basis. Subsequent court cases in Arkansas and Louisiana, he notes, have proven that strategy to be unsuccessful to date.

In summary he concludes:

> As to moral meanings, creationism has two overriding themes, namely: an unquenched hostility to the idea of evolution, based on the belief that evolution is intimately involved with immorality (even if cause and effect are unclear); and a quasi-religious awe of science (which creationists share with so many other Americans), so that creationism will be made more credible by the sanctification that supposedly flows from the plenary authority of science (p. 257).

In further explanation of the latter point, he contends that creationists have sold out to a secular authority (science) by relying far more on the "awe of science" than on scientific fact. Thus, their attempt to coopt science to enhance their biblical/moral perspective actually ends distorting both religion and science by forcing an incompatible marriage. In his article *(Natural History)*, he expresses this viewpoint on a more personal basis:

> When pressed about my personal views on evolution and science, I'd say that I was a Catholic, that I got my faith and morals from revelation and inspiration, not from biology or geology or anthropology. To me, I would explain, evolution is an empirical [scientific] fact, not a spiritual truth; I do not search it for God or godliness (p. 9).

It is certainly not invalid to study the creationist movement primarily from an anthropological-historical perspective, which Tourney does rather well. In fact, he is far more open to fair and objective observations than what is often the case. For example, he notes that creationists have presented a far more cogent case prepared by highly qualified scientists with credentials from the nation's most prestigious institutions than what many realize or were aware of. This has been found "shocking" (pp. 6-7) to many contemporary scientists who were used to a historically much less educated proponent.

However, the primary fallacy of his thesis is that he tries to explain the whole movement on a historical/cultural basis and almost totally neglects its scientific content. His conclusion is that creationism is a cultural phenomenon without valid scientific content. Such a conclusion can be reached if you simply confess that "evolution is an empirical fact," thus eliminating the need to deal with the scientific content of creation science. What is left over after this *is* a historical/cultural phenomenon. The problem, of course, is that the primary purpose of the creationist movement is its contention to be scientific according to accepted views of what constitutes true science (fact, hypotheses and theory appropriately defined), not, according to Tourney, an effort to twist some sort of "science" out of Genesis or force science onto some unsuspecting and unwilling Scripture.

But then, what choice does an anthropologist have, or a sociologist, or historian? If you limit yourself to the narrow scope of your academic discipline, your conclusions can only reflect the parameters of that discipline. My observation and research has demonstrated that social scientists who analyze the creationist movement tend to develop the same fallacy. As long as they stay within their discipline, their analysis is usually quite accurate and enlightening, often drawing insightful conclusions about the creation science movement. However, when it comes to the science part of the equation, they feel no obligation to deal with that for two reasons: 1) It lies outside their discipline, therefore it would not be appropriate for them to enter *terra incognita;* 2) they simply accept contemporary majority consensus-evolution-eliminating any need to address the scientific content of creation science. Thus creation science can be fully explained and analyzed by dealing only with one half of the equation. By academically eliminating or significantly reducing the major content of the creation science movement, they are essentially trying to make half an explanation cover a whole subject.

Such analysis also clearly implies that the primary motivation for someone to join the movement can only be religious or moral-precisely Tourney's thesis, as noted earlier-the scientific considerations simply cannot be taken seriously. This fallacy is further reinforced through a "guilt by association" comparison that aligns creation science with other groups and movements which are universally recognized as pseudo-science or are at best on the bare fringes of scientific acceptability. Note Tourney's viewpoint:

> To humanize the creationists, I consider them the same way other anthropologists behold the many fascinating peoples who capture our professional attention. This is not to agree with creationists any more than my brother and sister anthropologists place their faith in cargo cults, ghost dance movements, or African theories of witchcraft, but it is nevertheless an attempt to understand the existential meaning about immorality and science that make creationism what it is, and to interpret them fairly. Consequently, the spirit of this work is not to denounce the creationists' claims for having departed from scientific norms, but to see what their beliefs mean in the context of their lives (p 10).

However well-meaning Tourney may be, fair he is not. He repeats the social scientist's fallacy by summarily dismissing the validity of the creationist's science through associating it with pseudo-science movements, thereby dispensing with any need to seriously consider the scientific claims of the creationist.

My association with a large and growing number of creationists has clearly shown that although religious-moral factors figure prominently in their motivation, an equal if not greater motivation is based on careful and objective consideration of scientific detail. A fair research would at least give equal space to that possibility-a possibility Tourney's belief system obviously refuses to consider.

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PANORAMA NOTES

Rapid Canyon Formation Through The Cliff Sapping of Unconsolidated Clastic Sediments: Examples from the Southeastern United States

Introduction

Uniformitarian geology proposes that geologic weathering processes have remained at essentially the same rate since Earth's origin. However, proponents of that school are quick to point out that there are many exceptions. One of these exceptions is in the rapid formation of large scale canyons in unconsolidated sediments (i.e., gravels, sands, silts, and clays) across the Atlantic and Gulf Coastal Plains of the southeastern United States. These erosional features are also referred to as "badlands" topography (Fairbridge, 1968, p. 45). This note addresses some of the latest thinking on rapid canyon formation in unconsolidated sediments and includes several examples of where it is occurring in the Southeastern United States. This geomorphic process is important to young-earth catastrophists, because it provides possible analogies to rapid canyon formation and development (Williams, 1995: Holroyd 1987: 1990: 1994: Austin, 1994, pp. 99-102), and has probably occurred from the closing of the Flood Event to Present Age Timeframes (Froede, 1995). A glossary of terms is included at the end of this note to aid the reader in understanding some of the specialized words used in this paper.

Cliff Sapping

Cliff sapping is caused by the diffuse seeping of groundwater from the base of a slope, which causes a wearing away and undermining of the loose sediments such that overlying sediments collapse and the slope retreats more or less uniformly, maintaining a steep front (Higgins, et al., 1988, p. 394). It is usually initiated at the groundwater discharge point (i.e., seepline) either from a "perched" position created as a result of an impermeable layer or where seeps occur above the groundwater base-level. Typically the groundwater discharge point is associated with a nearby creek or stream. Seeps sometimes form at outcrops along creeks and streams following precipitation events, and usually cease following a lowering of the groundwater table below those seep areas.

Hydraulic Influences

As groundwater flows to the point of discharge, its velocity increases resulting in a pressure head flux at the seepline (Higgins et al., 1988, p. 394). This pressure difference is believed to enhance the rate of erosion. Once the loose material has been weathered from the slope face, additional physical processes, such as mass wasting, soil creep, and precipitation remove the material from the front of the cliff face. Groundwater seeps along the base of the cliff face also serve to move the slump deposits away from the cliff face and wash them down the seep-generated stream. The sapping of the base of the cliff causes it to retreat by parallel backwasting* (Higgins, et al., 1988, p. 394) [Figures 1, 2 and 3]. This creates a steep-faced front as the canyon erodes upgradient (i.e., headward) from the seepline.

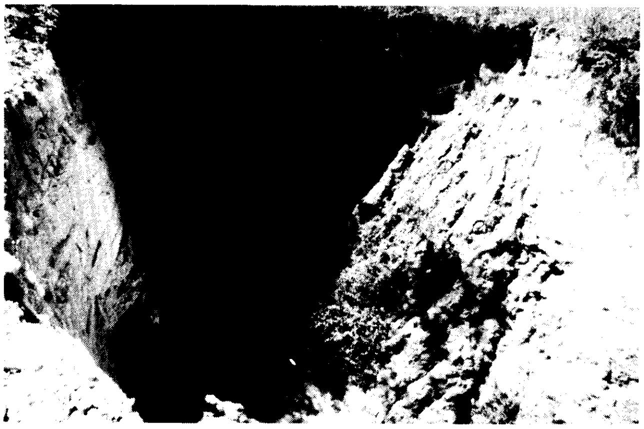

Figure 1. Cliff sapping of sidewalls. Note soil mass slumped at the base of the cliff face. This canyon was initiated with the construction of a nearby drainage ditch. The depth from the ground surface to the base of the pit, in this photograph, is approximately 18 feet. No surface stream is associated with this feature. Benton County, MS.

Geologic Influences

Several factors influence the formation of canyons in unconsolidated sediments. These include the topography of the basement, the thickness, depth, and lateral extent of clay or hardpan layers (which can create perched water table conditions), and the composition of the aquifer sediments. Additionally, the changes in regional groundwater base-level along with the level of precipitation experienced by the area also directly correspond to the formation of cliff-sapped canyons. These two factors are probably the most important in the cliff-sapping process. The author suggests that these two factors have changed significantly and somewhat rapidly over the course of Earth's history (using either the uniformitarian or young-earth Flood model).

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*Parallel backwasting--this process refers to the erosion of the canyon cliff face in a backward (i.e., headward) manner. There is no change in slope, rather the cliff face basically maintains its integrity as it moves into the canyon sidewalls. This process results in the large scale backward erosion of the cliff in an even manner.

Bedrock is known to directly influence both topographic characteristics and stream drainage density (Higgins, et al., 1988, p. 396). Where bedrock lies deep within the subsurface, various overlying impermeable layers (i.e., aquitards, aquicludes) serve to shape the surface expression of drainage density. Both basement rocks and these impermeable layers serve to limit the downward flow of groundwater, and contribute to the possible rapid rise of groundwater base-level following significant precipitation events. This rise in the local groundwater level could serve to increase the rate of erosion (i.e., as surface water run-off, from an effluent stream, and at the groundwater seepline) and enhance the formation and development of canyonlands.

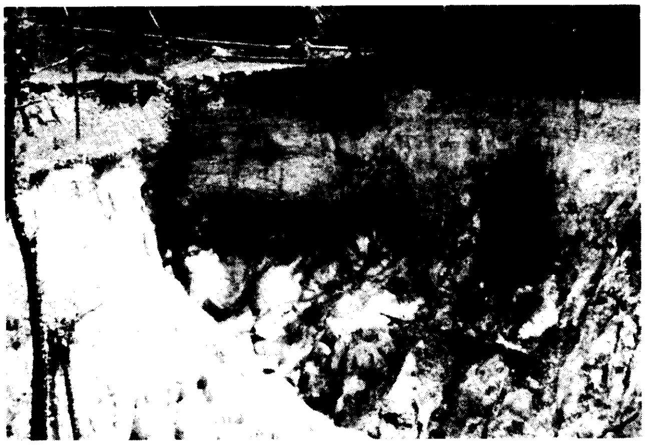

Figure 2. Massive canyon in Aiken County, SC. The depth from the ground surface to the base of the pit, in this photograph, is approximately 35 feet. No surface stream is associated with this feature.

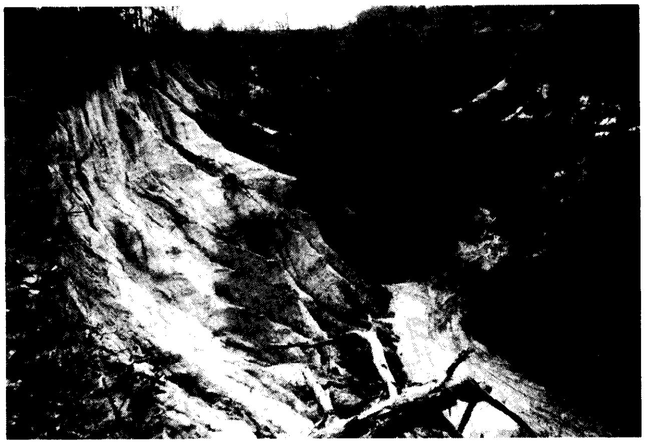

Figure 3. Unnamed Canyon located approximately one mile northeast of Providence Canyon, Stewart County, Georgia, along Georgia Highway 39c. This canyon exhibits badlands topography which is a geomorphic surface expression which the nearby Providence Canyon are also noted. The depth from the ground surface to the base of the pit, in this photograph, is approximately 199 feet. No surface stream is associated with this feature.

Clay or hardpan layers also create conditions which aid in rapid canyon development. Groundwater can become perched on top of these impermeable layers and discharge at higher elevations than the local groundwater table. This results in conditions where canyons can be initiated at higher elevations than under normal base-flow conditions (Joyce, 1985, p. 12). Hardpans form where minerals (mainly iron, aluminum, manganese, and in some instances silica) have been leached from upper units of sediment and have precipitated at depth, usually at a paleo-groundwater level, as a result of oxidation-potential changes. These hardpans and clay layers then serve to perch the local or area groundwater table and control the size and shape of the drainage basin (i.e., watershed). These impermeable clay and hardpan layers directly influence the formation of canyons in the southeast.

The sediments which compose the lithologic column of an area, directly affect the groundwater hydraulic properties when those sediments become saturated (Figures 4, 5 and 6). According to Higgins, et al. (1988, p. 396):

> When these sediments become aquifers, their history and properties can influence the behavior of

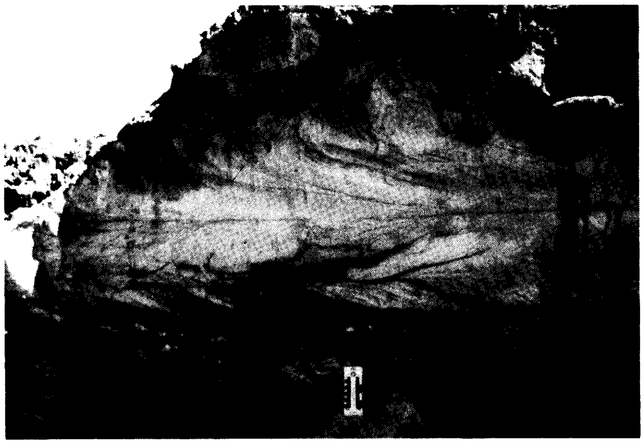

Figure 4. This is a closeup photograph of a cliff sidewall seen in Figure 1, showing semi-consolidated crossbedded sands which have contributed to the rapid development of the small-scale canyon. Scale is in inches and centimeters.

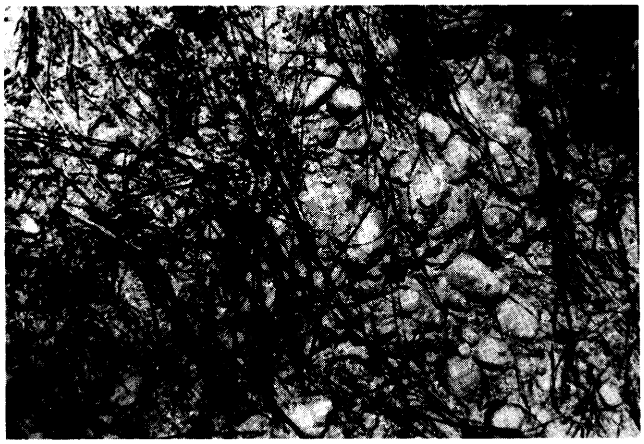

Figure 5. This is a closeup photograph of a cliff sidewall seen in Figure 2, showing pebbly to cobbly well-rounded quartz in the semi-consolidated Upland Unit (Miocene?). The Upland Unit is identified by these rounded quartz cobbles and is believed to represent fluvial channel deposits. This sandy unit has contributed to the rapid development of this canyon. These cobbles range between two to four inches in size.

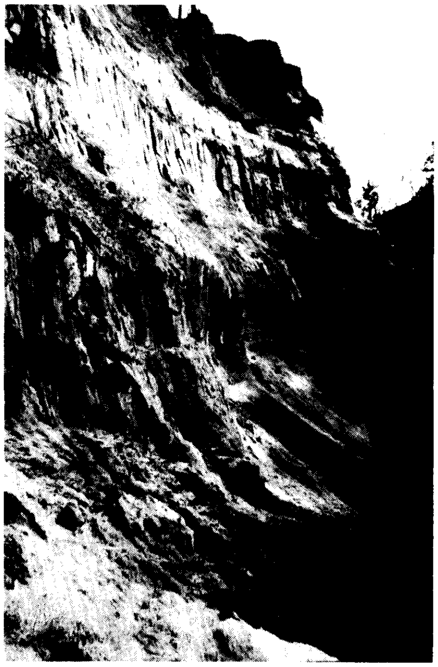

Figure 6. This photograph shows a multi-tiered sidewall exposed in one of the canyons at Providence Canyon. The reason for the tiering is due to stratification of the individual layers. Some layers weather more rapidly than others and this creates the stair-step nature of the canyon sidewalls. This sidewall is 75 feet high in this photograph.

> the groundwater. Thus, sediments which may also include regolith, alluvium, and colluvium, play important roles in the hydrologic realm by determining the recharge-discharge system and the nature and rates of infiltration, transmissivity, throughflow, and underflow.

These sediments form the porous layers, clay layers, and hardpans through which the groundwater flows either through, around, or over.

Examples From the Southeastern United States

Cliff sapping has created many canyons throughout the Southeastern United States which are commonly attributed to having originated from surface water run off. The author suggests that this erosional process has resulted in the swift removal of unconsolidated sediments, and the rapid formation of geomorphological features which could give the appearance of old age (see Williams, 1995, pp. 37-39).

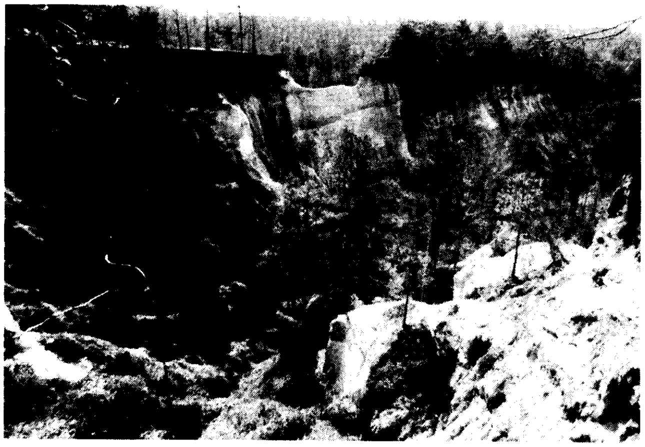

Figure 7. This photograph looks across one of the seven canyons of Providence Canyon, Georgia. The dark unit capping the white (Cretaceous) Providence sands is the Clayton Formation (Paleocene). Extensive erosion of the Providence Sands has resulted in the formation of the seven canyons. Note full grown pine trees growing in the canyon. The difference in elevation between the canyon floor and ground surface, in this photograph, is 166 feet. No surface streams are associated with the many canyons at Providence Canyon.

Some of the most studied and well known of the canyons which have formed as a result of cliff sapping are at Providence Canyon State Park (Figures 7 and 9) found in Stewart County, Georgia, southeast of the city of Columbus (see Joyce, 1985; Donovan and Reinhardt, 1986; Reinhardt and Gibson, 1980; Marsalis and Friddell, 1975; Williams, 1995). The Providence Formation sands are the main deposits exposed in the various canyons. These Upper Cretaceous deposits have been exposed to erosion for 60 to 65 million years. In that time they have been mantled by 15 feet of brown to red clayey Clayton Formation. Yet according to uniformitarian scientists, only within the past 150 years have the various canyons been formed. So we have millions of years of no canyon development and then almost in an instant of uniformitarian geologic time seven canyons with up to 150 feet of vertical relief. Something is clearly wrong with the uniformitarian proposal!

Williams (1995) provides an excellent overview of the rapid erosion occurring at Providence Canyon State Park, from the young-earth creationist's perspective. Dr. Williams' study, covering 10 years of measurements, documents the continuing development of the Canyons. The reader is encouraged to refer to this work for additional information regarding the rapid formation and development of Providence Canyon, Georgia. Currently, it is proposed that the various canyons found at Providence Canyon State Park were formed as a result of poor land management and not from groundwater hydraulics (i.e., cliff sapping or spring sapping) [Joyce, 1985, p. 8]. It has been widely recognized that the lack of a soil and vegetative cover does enhance and accelerate the development of canyonlands (i.e., badlands) [Twidale, 1968, pp. 15-18; Einsele, 1992, p. 359]. However, canyonlands have formed in areas where the groundwater conditions are sufficiently high enough to initiate the headward erosion of a gully turned canyon without the aid of a surface stream. Additionally, according to Twidale (1968, p. 18):

> The distinction between anthropogenic and paleoclimate forces is not always easy. Through the Mediterranean and North Africa, after the Roman occupation, there was a general desiccation of the climate; there was also overpopulation, overgrazing by goats and camels, and the breakdown of many organized controls. Hillsides were eroded and valleys became heavily silted. Was man's role purely secondary to the climatic change?

This writer believes that rapid changes in climate (both short and long term) have heavily contributed to various erosional features observed across the planet.

The many canyons found at Providence Canyon State Park present evidence to suggest that cliff sapping, via groundwater seeping, has provided the energy necessary to rapidly form and develop the canyons observed today. These canyons continue to erode both headward and laterally, ever seeking to establish equilibrium. Surface water run off probably initiated the formation of the canyons and the occasional heavy-rain event continues to wash away talus and slump deposits from the headward eroding cliff faces (see Williams, 1995). However, this author contends that the groundwater is the **main factor** in the development of the various canyons. No creeks or streams flow through the canyons today (see Williams 1995, Figure 5). Additionally, none of the canyon headlands contain any evidence of incised creeks or streams. All of the canyons contain cliff faces which give no indication of surface water run off. Turner Creek is a groundwater discharge stream with no headwaters (see Williams, 1995, Figure 10). It is contributing to the spring sapping of the canyons causing small landslides and resulting in the retreat of the valley head toward the base of the cliff. With the fluctuation of groundwater levels, the spring sapping moves both up and down the canyon floor continually removing the slumped sediments. Additionally, none of the other canyons discussed in this note have creeks or streams which pass through them, and they to are subject to the forces of cliff and spring sapping. While surface water probably originally aided in the formation of these canyons, it is cliff sapping which controls the further development of these geomorphic features.

Peneplanation

If millions of years were available for surface erosion via creek and stream development, as is predicted by the uniformitarian model, then there should be many more canyons than are presently observed on the southeastern Atlantic and Gulf Coastal Plains (see Walker and Coleman, 1987, Figure 5, p. 57). Additionally, if canyon development in unconsolidated sediments is a result of both topography (i.e., cuestas, ridges, or some doming feature) and overland flow then it would stand to reason that the increased occurrence of canyon formation (predicted but not presently observed) could have resulted from at least two different yet interrelated conditions.

The first predicted condition for rapid canyon formation would be based on the occurrence of historical lightning-generated forest fires. Areas with canyon producing potential would have been subject to many forest fires over the millions of years since the deposits formed and terrestrial conditions ensued. With a loss of ground cover (via forest fires) the canyons could have formed earlier in Earth history and much more rapidly due to the surface water runoff (i.e., from creeks and streams). This runoff would have resulted in the incision of gullies into the more permeable and more easily weathered underlying gravels, sands, silts, and clays. This in turn would result in the rapid development of creek and stream incised canyonlands.

However, none of the canyons discussed in this note have a stream or creek passing through them. All of these canyons have developed primarily as a result of the groundwater hydraulics operating at a seepline. While overland flow has contributed to the erosion of surficial sediments along the top edge of the cliff face, its main contribution is in its ability to transport away the slump sediments which have accumulated at the base of the cliff face.

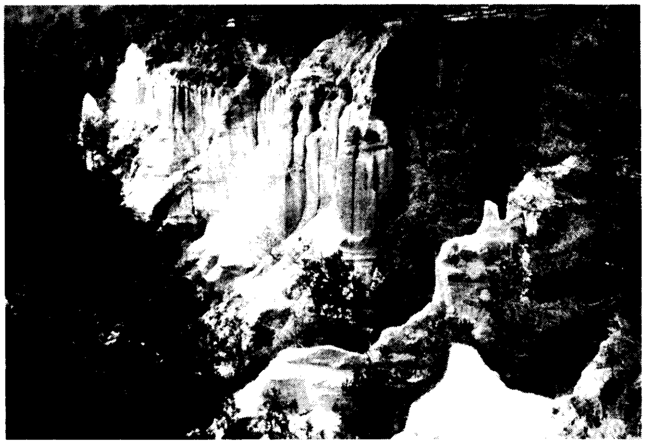

Figure 8. Providence Sands exposed along a canyon sidewall. Note the fence along the top of the canyon and the person against the fence for scale. The difference in elevation between the canyon floor and ground surface, in this photograph, is 100 feet. The canyons at Providence Canyon State Park continue to enlarge themselves both by headward and lateral erosion. The mechanism of cliff sapping at the seepline results in the undercutting of the overlying sands.

The second condition would be the change in climate experienced during the millions of years proposed by the Uniformitarians. All of these weather cycles and storms would have created conditions favorable for canyon formation (i.e., a rising and falling of the regional groundwater table and incised surface drainage gullies and streams). If millions of years of weathering cycles were available for erosion, then there should be many more canyons than are presently seen. Additionally, these coastal plains should be peneplaned down to much lower levels due to the headward erosion of these missing canyonlands.

However, if only a few thousand years have been available for erosion (via cliff sapping, spring sapping, mass wasting, soil creep, and precipitation), in accordance with the young-earth Flood model, then these canyons should be far fewer in number and their erosional level (i.e., maturity) should be much less. Additionally, all of the canyons discussed in this note are still seeking equilibrium conditions and continue to erode headward. New canyons are being formed today as a result of the groundwater hydraulic conditions. Again if millions of years were available for canyon development then we should observe many more than are present today. The young-earth Flood model appears to better fit with the evidences of rapid canyon formation and development as exhibited in the southeastern United States.

Conclusions

The author contends that the geomorphic process of cliff sapping has been commonly overlooked by uniformitarian geologists. These drainage systems are probably obscured by surface process and therefore are not viewed as important in valley-forming processes (Higgins, 1982, p. 147). However, while not viewed as important as an erosional process on Earth, cliff sapping is recognized as an important erosional process on the planet Mars (Higgins, 1982; Carr, 1984, p. 249; Sharp, 1973; Sharp and Malin, 1975)! Through the study of this process on the martian land surface it is hoped that cliff sapping on Earth will be better understood (Higgins, 1982, p. 152).

The uniformitarian model suggests that millions of years of weathering cycles are necessary to create most canyon features. However, the reader now understands that canyons can form, in unlithified sediments, in a matter of decades to centuries, under the right conditions. Many factors contribute to the formation of canyonlands (e.g., climatic changes, anthropogenic influences, lithologic boundaries, and hydrogeologic conditions). Extrapolating these same processes backward in time to the Upper Flood to Ice Age Timeframes, when sediments had possibly not completely lithified, provides a possible interpretation for the recent and rapid formation of other canyons (see Austin. 1994). However, not every canyon is a result of cliff sapping. A full investigation including regional tectonics, subsurface lithology, drainage density, surface water discharge, and groundwater movement must all be considered when attempting to understand the origin and development of a canyon in unconsolidated sediments (Carlston, 1963).

Glossary

Alluvium- A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material, deposited during comparatively recent geologic time by a stream or other body of running water, as a sorted or semisorted sediment in the bed of the stream or on its flood plain or delta, as a cone or fan at the base of a mountain slope; esp. such a deposit of fine-grained texture (silt or silty clay) deposited during time of flood (Bates and Tackson, 1987, p. 18).

Aquiclude- A body of relatively impermeable rock that is capable of absorbing water slowly but does not transmit it rapidly enough to supply a well or spring (Bates and Jackson, 1987, p. 33).

Aquitard- A confining bed that retards but does not prevent the flow of water to or from an adjacent aquifer (Bates and Jackson, 1987, p. 33). This layer is the most resistant to water flow.

"Cliff" Sapping- The natural process of erosion along the base of a cliff by the wearing-away of softer layers, thus removing the support for the upper mass which breaks off into large blocks falling from the cliff face (Bates and Jackson, 1987, p. 587). The erosional force (i.e., spring sapping) is provided by Turner Creek.

Colluvium- A general term applied to any loose, heterogeneous, and incoherent mass of soil material and/or rock fragments deposited by rainwash, sheetwash, or slow continuous downslope creep, usually collecting at the base of gentle slopes or hillsides (Bates and Jackson, 1987, p. 132).

Hardpan- A general term for a relatively hard, impervious, and often clayey layer of soil lying at or below the surface, produced as a result of cementation of soil particles by precipitation of relatively insoluble materials such as silica, iron oxide, calcium carbonate, and organic matter (Bates and Jackson, 1987, p. 299). Many times these layers form at lithologic contacts between strata where groundwater serves to precipitate minerals as the pH changes.

Regolith- A general term for the layer or mantle of fragmental and unconsolidated rock material, whether residual or transported and of highly varied character, that nearly everywhere forms the surface of the land and overlies or covers the bedrock. It includes rock debris of all kinds, volcanic ash, glacial drift, alluvium, loess and eolian deposits, vegetal accumulations and soil (Bates and Jackson, 1987, p. 558).

Spring Sapping- The erosion of a hillside around the fountainhead wellspring, springhead) of a strongly flowing stream, causing small landslides and resulting in the retreat of the valley head (Bates and Jackson, 1987, p. 637).

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Carl R. Froede, Jr.*

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*2895 Emerson Lake Drive, Snellville, GA 30278-6644.

SLIPPERY PHYLOGENIES: EVOLUTIONARY SPECULATIONS ON THE ORIGIN OF FROGS

RON CALAIS AND A. W. MEHLERT*

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Abstract

The fossil record is examined for evidence for the origin of frogs. While much diversity is found, little is discovered which would indicate that skeletal and muscular features of frogs were derived from other types of organisms. The anuran mode of locomotion and the molecular evidence for frog phylogeny is also reviewed. The apparent meaning of the Genesis "kind' is examined in relation to frogs, toads and other amphibians.

Introduction

The alleged evolution of frogs has not been addressed adequately by creationist writers, with the notable exception of Gerald Duffett's (1984) excellent discussion of the anatomy and physiology of a common species in the extant genus *Rana.* Unfortunately the article's lack of emphasis on the paleobiological aspect of the controversy tends to aggravate this pronounced gap in creation-related literature. We believe, therefore, it is time to examine the claims of herpetologists for the origin of this interesting group of amphibians. All frogs (and toads) belong to the superorder Salientia, order Anura (meaning the "tailless ones"), comprising some 23 families.

True frogs belong to the family Ranidae, and are classified into 30 genera with about 700 species, most of which live on the African continent and in the Orient. Adults may range in size from shorter than 2.5 cm. up to the 30 cm. giants of Africa. The genus *Rana* is by far the largest and most widely distributed, with about 200 species, and is the only genus of the family in North America.

Modern adult frogs adhere to a singular skeletal pattern: hindlimbs are greatly elongated relative to the forelimbs; the vertebral column consists of eight to 10 vertebrae; the skull is open and flat; a tail is lacking; the ribs are suppressed; the bones tailing the pelvis are fused to form the urostyle. Apparently in defiance of evolution, this same basic pattern, considered by zoologists to be among the most specialized of a vertebrate order, has remained unchanged through geologic time.

Although most frogs display rather drab coloration with greens and browns predominating, some exotic species are quite colorful with bright blue, yellow, and red hues. A few even have the ability to change color! Like the toads, some frogs possess poison glands, but unlike the warty-skinned Bufonidae (true toads), most frogs sport smooth, slippery skin. Aquatic habitats predominate among frogs, but a few are quite at home in the trees (arboreal) and some types are even fossorial (burrowing). Perhaps the most remarkable group of frogs, all belonging to the genus *Rhacophorus* of southeast Asia, have been observed gliding from trees by spreading out the thin webbing between their toes.

Frogs are overwhelmingly nocturnal and pass through a complicated life-cycle which begins as a gelatinous egg deposited in water, from which a tadpole or "pollywog" hatches a few days later. Within months, the tadpole-stage undergoes a process of metamorphosis, at which time the animal is transformed from a fish-like form into a juvenile frog. Lungs develop where gills once provided a supply of oxygen. Then the limbs appear, the tail is absorbed and the mouth becomes typically frog-like.

Evolutionists' Comments on the Fossil Record of Salientia

Can we find from the fossils, the amphibian-type ancestor of frogs and their cousins the toads? Although much has been written by transformist authorities on this subject, the answer appears to be a firm "NO." To confirm this we present the following candid admissions from leading evolutionists in the field: ". . . interpretations of frog phylogeny are unavoidably conjectural" (Orton, 1957, p. 79).

"The fossil record for anurans is so incomplete that it has not been possible to establish with certainty the area of origin of the major taxa" (Blair, 1973, p. 4).

"It is thus apparent that the early evolution of frogs is not yet represented in the fossil record" (Estes and Reig, 1973, p. 11).

"Numerous fossil frogs have been recovered and described, but they contribute relatively little to our understanding of the phylogeny of frogs" (Inger, 1966, p. 369).

"The fossil record of frogs prior to the Cretaceous is poor. The single specimen of *Triadobatrachus* from the Lower Triassic of Madagascar demonstrates that stem-anurans with just a few anuran skeletal characteristics had evolved by the beginning of the Mesozoic . . . However, no other Triassic anurans are known and few frogs have been described from Jurassic rocks, . . ." (Evans, Milner, and Mussett, 1990).

In the same vein Romer (1966, p. 100), concluded that little is known of the evolutionary history, and wrote further that ". . . even the 'primitive' frog families differ only in *relatively minor* features from the more 'advanced' ones" (emphasis added). The earliest-known fossil frog (genus *Vieraella)* has a generally modern appearance, despite its great age-allegedly 180 million years.

Hecht in 1963 (p. 20), stated

> The earliest-known true frog is *Vieraella herbstii* **. . .** from the Lower Jurassic of Argentina." Hecht wrote that *Vieraella* "did *not* have the primitive forearm, but a true *modern* radio-ulna of the typical Anura, and that furthermore there is little evidence in this fossil to indicate greater primitiveness than is *already known* in living and fossil frogs [p. 27, emphasis added].

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*Ron Calais, 137 Oak Crest Drive, Lafayette, LA 70503; A. W. Mehlert, P.O. Box 30, Beenleigh 4207, Australia.

Another remarkably well-preserved anuran genus is the genus *Eodiscoglossus* from the Jurassic of Spain and England (Hecht, 1970; Evans, Milner and Mussett, 1990; Evans and Milner, 1993). Hecht notes that these types actually retain a keratinized integument-the nuptial pad on the enlarged pollex. This *is identical* to the condition found on breeding males of extant species, and provides conclusive evidence that amplexial behavior was already established in some of the earliest frogs. Based on the available fossil evidence, frogs appear in the middle Mesozoic, not only morphologically similar to modern forms, but also apparently with similar behavioral patterns as well.

Anuran Origins-Drowning in Evolutionary Speculation-The Triassic Period

Are there any suitable amphibian candidates for frog ancestry in the preceding Triassic or even in earlier Permian or Carboniferous times? The fossil record has so far provided only one dubious candidate called *Triadobatrachus* (Rage and Rocek, 1989). Coleman and Olive Goin (1962, pp. 66, 68), tell us that

> For a time it was thought that *Protobatrachus* [now referred to as *Triadobatrachus]* of the Lower Triassic represented an intermediate stage in the evolution of the frogs . . . It is highly probable that the single known specimen of *Protobatrachus* [*Triadobatrachus]* was ***not*** a true evolutionary intermediate, but a metamorphosing tadpole . . . [The frogs] *cannot* be traced back to any known group of Paleozoic amphibians . . . they *may* be related to the anthracosaurs [emphasis added].

Hecht (1962, p. 39), confirms the lack of evolutionary development implied by the Goin statements: "The first tree frogs appear in the Jurassic already bearing the major characteristics of the group." After examining the features of *Triadobatrachus*, Hecht again agrees with the Goins by stating (p. 41) that "Various characteristics, if present, are faint indeed. They can only be interpreted as such (frog-like) impressions *if one knows that Triadobatrachus* is a frog . . ." [emphasis added]. Hecht (p. 43) states that it is impossible to determine what relationship, if any, that *Triadobatrachus* has to frogs, and that to present it as an intermediate form between modern frogs and ancestral amphibians is no longer a certainty. On page 31 of Part Two of his work, Hecht clearly exclaims that *Triadobatrachus* is *not* on the phylogenetic line of the frogs and concludes that there are *no* clear ancestral groups known.

Orton (1957, p. 80), goes further and writes-"All of the known recent frogs have essentially the same peculiar structural plan." She could have gone a little further and come to the same conclusion with respect to the more ancient forms! She expresses a conviction which is, that if *Triadobatrachus* is only a metamorphosing tadpole, then the tadpole-frog structural plan was *already* in existence by Late Triassic times. She writes that ". . . it is difficult to find anything of clearly primitive nature in any of the frogs" (p. 81).

A Later View

Thus far we have cited a number of authorities from the past, but has the position changed in recent years? Unfortunately for evolutionists, the answer is "no." A current authority on amphibians, Dr. G. Minelli, Professor of Comparative Anatomy at the University of Bologna, Italy states that (1987, p. 26):

> The problem of linking present-day amphibians to those which ruled during the Carboniferous Period has not been satisfactorily solved yet. We can only make hypotheses . . . Maybe their evolutionary line started when all the old amphibians disappeared.

He says:

> In the Triassic Period, 200 million years ago, we meet *Triadobatrachus,* with a frog-like skull, pelvis and short tail, and with conventional, not specialized legs. This is still an anuran, not yet specialized for jumping, but it soon will be . . . Looking at amphibian skeletons for the Carboniferous period, we do *not* see any typical frog feature [emphasis added] (p. 27).

No connecting links are known to any earlier amphibian.

He (p. 27) writes that the 150 million year old (Jurassic) skeleton of *Neobatrachus* has all the features of a frog or a toad, and that there can be no doubt that it is an anuran. It thus seems that if the time-scales are valid, the frog has undergone hardly any change.

One might object that being a soft-bodied creature, there are not enough fossil anurans available to trace their ancestry, but this is not true. Many fossils have been recovered from the Recent back to the Mesozoic, but the biggest gap remains where it always is-between the first true frog and whatever is supposed to have given rise to it. Once again we have the all too familiar major missing link.

An Abandoned Ancestor

Another anuran ancestor which ran into troubled waters was a small labyrinthodont- *Amphibanus grandiscene.* It was found encased in shale nodules in the Mazon Creek region of Illinois and is probably less known among professional paleontologists. The fossils were first described in 1940 by Watson, who believed it to be a primitive "proto-frog" and assigned it to the suborder Phyllospondyli. Gregory in 1950 and Carroll in 1964 reasoned that Watson's frog-like features perceived in *Amphibanus* were based on shoddy misinterpretations, and that his new suborder created for this fossil should be abolished. Furthermore, Bolt (1979, p. 535) found that Gregory's redescription of *A. grandiceps* eliminated most of the detailed resemblances to frogs. He concluded that there is no special relationship to frogs, and argued instead that *A. grandiceps* was most closely related to the rhachitome family Dissorophidae. Thus another speculative phylogeny was quietly eliminated from the literature.

Barbara Stahl (1974, p. 246) frankly states that ". . . forms transitional between primitive types and more advanced ones are *not* available," and that therefore the investigators have difficulty in constructing a phylogenetic scheme to underpin the classification of frogs. She further states that "No one believes that any frog or toad now living can be likened to the ancestor of any other" (p. 248). This is a reasonable admission.

We hardly need to document any further the total inadequacy of the fossil record to supply even a caricature of frog evolution, but to re-emphasize the point once more, we quote from Joseph Tihen, who served in the Department of Biology at Notre Dame University. In a 1965 paper (pp. 309-310) he said:

> At present one can only say realistically that the ancestor of the Anura (frogs) remains virtually unknown . . . About six anuran genera are known from the Jurassic . . . all are *true* Anura, with the specializations that characterize the order as a whole . . . *none* exhibit any recognizable primitive characteristics that *are not retained* by at least some living forms . . . our interpretation of the fossils is effectively based on evolutionary *inferences* drawn from comparative studies of modern Anura, rather than the fossils . . . [emphasis added].

Primitive or Advanced?

Creationists often refer to the question of subjectivism in relation to evolutionary theory. It is important to note what Tihen also wrote (p. 310) regarding the early candidates for anuran ancestry. Referring to the highly-fancied fossil frogs *Vieraella* and *Notobatrachus* as having free ribs, the author said

> We can say that they are primitive in this respect, not because these early fossils have them, but because *we are already convinced* that primitive types had free ribs [emphasis added].

After reviewing the three major criteria established for the identification of "primitive" characters in fossil organisms, Trueb (1973, p. 66) notes that since

> . . . the fossil record of anurans is so poor that for most characters, it is of little use in determining primitive states . . . we (evolutionists) are left little choice but to reason inductively on the basis of these (three) hypothetical criteria for primitiveness. The potential fallibility of the reasoning employed is obvious.

We see therefore that the term "primitive" is highly questionable when dealing with frogs. There is only variety and diversification. Many of the experts simply "see" what they want or expect to see, in accordance with the presuppositions they carry over from evolutionary theory.

Tihen provides an excellent example of this pervasive attitude:

> Interpretation of many myological (muscular) characteristics may involve a sort of circular reasoning. A certain condition exists in some group or groups that we believe to be primitive, and then use the condition as evidence of the primitive station of frogs that possess it (p. 313).

The simple fact remains that when undue speculation is dispensed with, a proper assessment of the anuran fossil record reveals the existence of basically modern-looking frogs at the earliest stages of their assumed evolution. Members of the order suggest no real evidence of evolutionary ancestry. It is probably for this very reason that "Current work on frog phylogeny has made little use of the existing fossil record" (Estes and Reig, 1973, p. 11).

Locomotion: Did Frogs Evolve by Quantum Leaps?

If evolutionists seem confused and puzzled over the assumed phylogeny of the anurans, similar problems arise when attempts are made to explain the processes which supposedly led to their rather unique mode of locomotion.

Most students have assumed that the frogs and their immediate ancestors were aquatic, because the origin of frog locomotion is only explicable in terms of evolution in water where the swimming-leaping motion had the function of pushing the "pre-frogs" into aquatic vegetation or into muddy substrates. According to this view the swimming-leaping movement in water was primary; whereas terrestrial leaping was secondary. Other views suggest that the adult "ancestors" of frogs were terrestrial animals using the saltatory locomotion as an escape mechanism.

Among the reasons given in favor of an aquatic genesis is that the demands on the swimming apparatus provided the basic requisite for jumping. Actually the swimming and leaping movements of adult frogs are very much alike, with the hind limbs acting in unison, thus giving the forward thrust in water and the leaping ability on land. If frogs were descended from an aquatic amphibian ancestor, it is logical to believe that this ancestor possessed the long tail common to all the supposedly early amphibians, allegedly derived ultimately from a rhipidistian fish. Therefore the frog group anurans had to lose their tails while still aquatic, which would mean the loss of a very efficient form of guidance while moving in water. To suggest that early frogs did this while *gradually* acquiring a new and less efficient means of aquatic propulsion, i.e. the rearward thrusting of the hind limbs, is asking a great deal and places much strain on one's credulity. Two biologists, from the University of Pennsylvania, and the Marine Biological Laboratory (Woods Hole), who studied and experimented with frog locomotion, concluded their study by postulating that "many different parameters must have evolved *in concert to produce a system capable of this explosive movement* [emphasis added]" (Lutz and Rome, 1994, p. 370).

Some authorities have argued forcefully for a terrestrial origin for anuran locomotion. Two such are Carl Gans and T. S. Parsons, (1966, pp. 92-99). Before presenting their case, the authors state that it is "dangerous to speculate about the origin of a particular adaptation in a group of essentially unknown ancestry." Referring to the assumed pre-frogs, the authors (p. 92) say that in many of these amphibian groups, the adult stages ". . . showed trends toward a relatively short-coupled body-form with sizable legs that extend laterally and cantilever the trunk between them." With splayed legs in much same way as modern crocodiles, forward locomotion is relatively awkward because the animal has to sway itself each time it takes a step. Gans and Parsons go on to say (p. 92): "It is not clear what produced the adaptive trends that led to the shortening of the trunk . . ." We agree that it is difficult to visualize such a large transformation which allowed the animal to remain viable at all stages.

Minelli, speaking of "adaptations" (p. 55), points out that if a certain feature is not continuously favored (by selection), it will disappear. This makes both preadaptation and "ordinary" adaptation difficult to accept as viable evolutionary mechanisms. For example, some cave fish have lost their sight, and some reptiles, including snakes, have lost their legs. Minelli states that according to the "old" theory,

> reptilian features began to occur accidentally (mutational) but progressively among the amphibians. These features did them no good, but they did not harm them either. They were neutral as it were. When the environment changed, the animals endowed with these new characteristics were favored, and they asserted themselves. But this theory is *in contrast* with the banal statement that if a certain feature is not continuously favored, it soon disappears, as was the case with the eyes in cave-dwelling animals and the legs in crawling animals [emphasis added].

Obviously this would apply to all organisms including amphibians. It would seem to us that the only way adaptations would be useful would be if they evolved very rapidly to "fit" the new environment and the chances of this happening frequently are zero. Slow and gradual evolution would be out of the question. The only answer appears to be that the organisms possessed the genetic variability *right from the start.*

More Difficulties

In common with other major groups of plants and animals, the postulated evolution of the anurans from as yet undiscovered amphibian ancestors still poses mostly unresolved problems.

Writing in the massive treatise, *Evolutionary Biology of the Anurans,* W. Frank Blair (1973) examined a host of such difficulties. Besides the problem of the missing fossil evidence, the questions raised by Blair include problems relating to probable parallel/convergent evolution, how certain specializations arose and became "perfected," the mechanism of speciation, diversification, and relationships between various species. The obvious shortcoming of Blair's review is that while he succeeds masterfully in presenting all of these problems, he fails miserably, as do the other contributors to the volume, in arriving at feasible solutions. Estes and Reig (1973, p. 11) candidly declare:

> Although it is frequently expected that paleontological evidence may afford sound conclusions for various unsettled questions about the evolutionary biology of a given taxon, such an expectation will not necessarily be satisfied in the present paper.

Blair inquires as to "How much has our understanding of phylogenetic relations been clouded by convergent evolution?" As creationists, we should understand that many phylogenies are plagued by this very problem. It arises because evolutionists often have great difficulty in arranging the "lineages" by mistaking simple lateral variation within a type or kind for vertical (mega)-evolution. This holds true whether the morphological variability is among contemporaneous forms, or over vertical (different) time-periods.

Again Blair asks: "Why are some genera monotypic and seemingly have been monotypic or nearly so throughout their histories, while others split into many species?" For creationists, it presents no particular problem if one accepts the original and potentially variable created Biblical "kind" or "Baramin" as being roughly equivalent to the modern "family" taxon; although this would not be true for all types such as humans where there really is only one species, or at the most, one genus. It should, however, be apparent that the Creator did not endow every kind with the same range of genetic variability-some "families" are comprised of many more genera and species than others.

A comparison between anurans and mammals clearly illustrates this "disparity" in morphological variability. Structural (protein-producing) genes in frogs are much more divergent than in modern mammals, but in anatomy they are much less divergent. While frogs are now classified as a single order, mammals fall into 16 different orders!

> They (frogs and toads) have not been exempt from mutations but have varied in regulatory genes much less than mammals. Consequently, frog species are much more hybridizable than mammals (R. Wesson, 1991, p. 202).

While creationists accept speciation, they view the process of natural selection as a strictly limiting factor, capable of producing only changes on a small scale by acting on traits already present in the genetic population. Evolutionists argue that there is a certain amount of inconsistency in this view and continue to imagine unlimited changes among organisms over time, despite the lack of hard evidence in both genetic research and the historical (fossil) record (Newman, 1992; Goin and Goin, 1971, pp. 68-71).

Molecular Arguments

Because of the disappointing results obtained from fossils in their attempts to construct a viable anuran phylogeny, evolutionists have turned to biochemical studies of modern frogs and other amphibians. These, not surprisingly, have proven frustratingly contradictory (see Estes and Reig, 1973, p. 43). One series of DNA tests indicated both apodans (limbless amphibians) and urodelans (tail-bearing amphibians) were most likely derived from a common ancestral stock, while frogs probably originated from labyrinthodonts that were closely related to the ancestry of reptiles. Similar work by another group of specialists, however, supports totally different conclusions.

Karyological studies performed with selected vertebrates indicate that the so-called "primitive" frogs and salamanders, as well as some apodans, possess similar karyotypes, leading some authorities to suspect ancestral relationships between the Lissamphibians (a collective term denoting the three living amphibian orders). Hillis (1991, p. 26) states:

> Data from morphological and molecular studies strongly support the monophyly of the living amphibians and place the Lissamphibia as the sister group to the amniotes [reptiles, birds and mammals: those animals which have an amnion-a membrane enclosing the embryo].

However, Estes and Reig observe (p. 44), "The fossil record of modern amphibians does not shed light on the question of the reality of the Lissamphibia," and they further express caution in using this chromosomal data to verify the Lissamphibia hypothesis.

They also point out that the Triassic form *Triadobatrachus,* previously described in this paper, is ". . . well advanced in the direction of anurans . . .," and neither this fossil nor the other early anurans divulge any clues which point to relationships with any other group of amphibians.

Another Dead End

Apparently undeterred by this scientific revelation, some evolutionists such as Parsons and Williams (1963), prefer to imagine the existence of a "protolissamphibian" faithfully predicting its future discovery somewhere in the fossil record. In fact, the labyrinthodont *Doloserpeton annectens,* from the lower Permian of Oklahoma, has been cited as a possible "proto-lissamphibian," seemingly fulfilling some of the evolutionary requirements of such a transitional form. Yet upon closer scrutiny, *Doloserpeton* proved to be no closer to a "protolissamphibian" than other dissorophoids.

Although much has been made of the fact that *Doloserpeton* possessed pedicellate (bicuspid-like) teeth, its value as an indication of phylogenetic relationships is highly questionable, because analogous structures occur in the Teleostei, the bony fishes. Estes and Reig conclude their discussion of *Doloserpeton* with the following cautionary note:

> It is clear that additional work is necessary before pedicellate teeth are considered as a necessary protolissamphibian character state, or (perhaps more important) that the presence of such teeth in a labyrinthodont is unequivocal evidence of ancestry for any of the modern orders. Besides this, it is also clear that *Doloserpeton* has *no* features that specifically suggest relationships with frogs [emphasis added] (p. 45).

Conclusion

Our review of the claims for anuran evolution, as perceived by Darwinists, shows that these claims are simply not substantiated by fossil or molecular evidence. The extensive fossil record has not yielded any convincing discoveries which would support the idea that frogs and toads evolved from other orders of amphibians. "At present," said Tihen (p. 309), "one can only say realistically that the ancestry of the order Anura remains virtually unknown." Tihen's statement remains just as true to this day as we have seen with the comments of Minelli in 1987.

Even with the amphibians as a class, there is little compelling evidence of their alleged origin from crossopterygian fish of the Devonian. Many now share the opinion expressed by Parsons and Williams that the evidence is still insufficient for a decision on the question of amphibian ancestry (Wever, 1985, p. 9; Minelli, 1987, p. 20).

Finally we quote from two other modern authorities,

> The higher taxonomy of anurans is NOT well established. Present knowledge of many characters and the direction of their (alleged) evolutionary change *does not permit their utilization in the reconstruction of a phylogeny* (Duellman and Trueb, 1986, p. 515-emphasis added).

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THE GEOLOGIC COLUMN AND THE FLOOD OF GENESIS

HENRY M. MORRIS*

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It has been 35 years since the Lord graciously used the book *The Genesis Flood* (Whitcomb and Morris, 1961) to revitalize the all-but-dead Christian belief in true Biblical creationism as revealed in the first 11 chapters of God's written Word.

The Genesis record of the creation of all things in six literal days, followed by the entrance of death and suffering into the world because of Adam's sin, then followed by the world-destroying cataclysmic deluge in the days of Noah, had been almost universally believed in Christendom for hundreds of years. But this sound Biblical doctrine had been undermined and almost destroyed in the 18th and 19th centuries by the uniformitarian geology of Charles Lyell, and the corresponding evolutionary biology of Charles Darwin and his followers. A seemingly final blow was the 1925 media circus known as the Scopes Trial. For a whole generation after that, even the fundamentalists who still believed in the Bible either accepted or ignored the evolutionary ages of geology, thinking they could somehow "harmonize" this system with the creation record of Genesis, by using either the venerable "day-age theory" or the geologically untenable "gap theory."

Such compromises were both Biblically and scientifically flawed, however, for many reasons which need not be reviewed here (Morris, 1985, pp. 203-256). The result was that, by 1960 at least, evolutionism in one form or another completely dominated the schools and colleges of the whole world, as well as most of the churches. The scientific and educational communities, in particular, were utterly unimpressed by these "Christian" compromises and total evolutionism seemed to have triumphed-as was loudly proclaimed by Julian Huxley and others at the great Darwinian Centennial in 1959.

Genesis or Geology

The "geologic ages," speaking as they did of a billion years of suffering and death, of evolutionary struggle for existence and survival of the fittest, so glaringly contradicted the Biblical revelation of a Creator who is a God of love and self-sacrifice, a God of both omniscience and omnipotence, that the very concepts seemed mutually exclusive to most people, especially if they understood both Genesis and evolutionary geology. Consequently, true Biblical creationism seemed dead, thoroughly discredited by historical geology, and the proposed compromises became objects of ridicule by almost everyone with any training in geology.

The "geologic ages," however, are actually nothing but a philosophical construct, formally organized in what is known as the "geologic column" This column is a theoretical cross-section through the earth's crust, from the surface down to the crystalline rocks which compose the "basement." The sediments comprising the crust have obviously been transported from various source areas mostly by moving water, then deposited and usually hardened to become lithified sedimentary rocks (limestones, shales, sandstones, etc.). It is commonly assumed that the "oldest" sediments are at the bottom of the column, with the "youngest" on top. All of this is supposed to have taken hundreds of millions of years to accomplish-hence the geologic "ages."

Since the same lithologic types of rocks and types of structural features occur throughout the entire column, the only way the different "ages" of the rocks are identified is by the different types of once-living plants and animals found buried and fossilized therein. Thus, rocks that contain what are considered "ancient" forms of fossils are considered old, while rocks containing more "modern" forms are assumed to be young. This summary is over-simplified, but essentially does represent how rocks are "dated" and assigned to specific geologic "ages." The following statements from the standard geologic literature convey the significance of fossils in age-dating:

> The geologist utilized knowledge of organic evolution, as preserved in the fossil record, to identify and correlate the lithic records of ancient time (von Engeln and Caster, 1952, p. 423).
>
> The only chronometric scale applicable in geologic history for the stratigraphic classification of rocks and for dating geologic events exactly is furnished by the fossils. Owing to the irreversibility of evolution, they offer an unambiguous time-scale for relative age determinations and for worldwide correlations of rocks (Schindewolf, 1957, p. 394).
>
> . . . fossils have furnished, through their record of the evolution of life on this planet, an amazingly effective key to the relative positioning of strata in widely separated regions and from continent to continent (Hedberg, 1961, p. 499).
>
> The age of rocks may be determined by the fossils found in them (Welles, 1978, p. 5).
>
> Ever since William Smith at the beginning of the 19th century, fossils have been and still are the best and most accurate method of dating and correlating the rocks in which they occur (Ager, 1983, p. 425).

These statements are from older geological writings, but the concept and method of dating rocks by their fossil contents-assuming evolutionary progression-has not changed. To the objection that this method of dating was in use before Darwin popularized evolution, the answer is that evolutionism was being advocated long before Darwin. In fact, before very many fossils had ever been found and analyzed, it was assumed that they should be arranged chronologically to conform to the assumed "Great Chain of Being," a pantheistic concept originating in ancient Greece, and very prominently utilized by humanists during the Renaissance and later by pre-Darwinian evolutionists in particular. This concept assumed that there was an unbroken chain of entities in nature from the simplest to the most complex, and the early attempts to organize the fossil record in a chronologic sequence were, to a large extent, based on this ancient pagan idea (Morris, 1989, pp. 183-195).

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*Henry M. Morris, Ph.D., Institute for Creation Research, 10946 Woodside Avenue N., Santee, CA, 92071.

It has long been recognized that the geologic column is an arbitrary construct, existing nowhere in full in any *local* geologic column. Various concepts were used in the early 19th century to combine all the scattered local columns into one global *standard* column.

> By application of the principle of superposition, lithologic identification, unconformities, and reference to fossil successions, both the thick and the thin masses are correlated with other beds at other sites. Thus there is established in detail the stratigraphic succession for all the geologic ages (von Engeln and Caster, 1952, p. 417).

More recently, in a very comprehensive study of all the local columns on all the world's continents everywhere, creationist geologist John Woodmorappe (1981) demonstrated that the standard column was actually non-existent anywhere. He concluded that:

> . . . 42% of earth's land surface has 3 or less geologic periods present at all; 66% has 5 or less of the 10 present; and only 14% has 8 or more geologic periods represented at all.

He also concluded that "slightly less than 1% has all 10 periods simultaneously in place (p. 67)."

Even that 1% is too high because it represents only the land surfaces. If the ocean bottoms are factored in (so far as known, none of these have the complete column in place, usually only containing Tertiary and possibly Cretaceous sediments), the portion of the earth's surface containing the complete column in place is only l/3% or less.

Not even this small percentage tells the whole story, since none of the 10 geologic periods are *fully* represented anywhere. The average thickness of local geologic columns is only about one mile, whereas the standard column with all 10 periods and their subdivisions represented in their fullness would be *at least* 100 miles in thickness (von Engeln and Caster, 1952), p. 417)!

The geologic ages thus are tied to the standard geologic column, but the latter is hard to find, except in textbooks. There seems to be a legitimate question whether either the column or the ages really exist. It is impossible to insert these ages into the Biblical record and very difficult to locate the standard column in the geologic record. Both seem to be based essentially on belief in evolution, but evolution remains an unproved assumption-one which is not only contrary to Scripture but also devoid of any real scientific evidence. However, two recent creationist geologists have published tentative proposals for correlating the geologic strata with the Biblical record of the Flood (Froede, 1995a; Walker, 1994).

The identification of the various geologic ages, as noted above, is based on their fossil contents, but fossil taxons normally persist through many of these ages. Thus only certain index fossil assemblages are actually used to date the strata. Furthermore, fossils are not infrequently found out of their assumed places in the evolutionary sequences (an anomalous situation supposedly caused by reworking and secondary deposition) and whole formations are sometimes found out of the standard evolutionary order (a phenomenon supposedly attributed to the remarkable process of "overthrusting"). Even in those cases where the few ages in a local column are in the proper order, they often are not sequential, with much of the standard column missing. In addition, every geological period, from Cambrian to Tertiary can often be found resting on the basement, just as every period can often be found right on the earth's surface. There seems to be nothing very standard about the standard geologic column!

The standard column does serve evolutionists well, of course, as their best argument for evolution. The fossil record, even though it contains *no true transitional fossils* (Gish, 1995), is still presented as a persuasive evolutionary argument by means of its organization into the geologic column.

> . . . fossils provide the only historical, documentary evidence that life has evolved from simpler to more and more complex forms (Dunbar, 1960, p. 47).
>
> Naturalists must remember that the process of evolution is revealed only through fossil forms (Grassé, 1977, p. 4).
>
> . . . we must look to the fossil record for the ultimate documentation of large-scale change. In the absence of a fossil record, the credibility of evolutionists would be severely weakened. We might wonder whether the doctrine of evolution would qualify as anything more than an outrageous hypothesis (Stanley, 1979, p. 2).

In view of the vital importance of the standard geologic column and its associated fossil record to the whole question of evolution, and in view of the ephemeral and variable nature of the local columns which supposedly can be fitted into it, as well as the utter non-existence of genuine scientific evidence for evolution at all, it is surely appropriate to ask whether there might be a better explanation for the fossil record than the geologic column and its assumed evolutionary ages.

The Global Flood

Indeed there is a better explanation. The divinely inspired record of the Bible describes a global hydraulic cataclysm that devastated the antediluvian world, killing all of its land-dwelling animals and humans (except those in Noah's Ark), covering all the mountains of the world at its crest and continuing for a whole year. If such a cataclysm (involving tectonic and volcanic activity on a massive scale, as well as torrential rains and violent winds, affecting the entire world) really occurred, then it would definitely and profoundly affect the geologic record. If any earlier geological deposits had ever been formed, they would almost certainly be overthrown, reworked and redeposited, as well as destroying all the pre-Flood topography. After it was all over, including its after-effects, the resulting worldwide "geologic column" would be a record, not of the evolution of life over many long ages, but rather of the destruction of life in one short age, that of the Flood period.

This, in fact, was exactly the belief of the founding fathers of the science of geology-men such as Steno, Woodward, Burnet, Whiston and others, and endorsed by leading scientists in other fields such as Isaac Newton. This paradigm later shifted to evolutionary uniformitarianism, especially through the publications of Lyell and Darwin, with the way being eased by the compromising multiple-flood views of Cuvier, Buckland, Sedgwick and others.

As noted before, evolutionary uniformitarianism has held sway ever since. The various proffered pseudo-Christian compromises (day-age theory, gap theory, multiple-catastrophe theory, etc.) seemed to make no impact whatever on the scientific and educational worlds. It is disconcerting now to see many Christians who consider themselves creationists still proposing such theories, both to appease the evolutionists and also to oppose those whom they call "young-earth creationists."

The fact is, however, that the remarkable modern revival of creationism (there are now thousands of scientists, in addition probably to millions of people in other fields, who have become literal creationists) has been brought about primarily by a belief in the Flood as the true explanation of the geologic column. This was the main theme of the book *The Genesis Flood,* first published in 1961. The resulting formation of the Creation Research Society and scores of other creationist organizations all over the world has been based on the same premise-that of literal six-day creationism and Flood geology.

The current complaint of the so-called "progressive creationists" that our emphasis on six-day creation and the global cataclysmic flood is somehow hindering their efforts to win scientists and other intellectuals to Christ is falsified by the fact that a whole century of advocating progressive creationism and other compromise theories resulted only in alienating practically the whole intellectual world. The modern revival of strict creationism, on the other hand, has resulted in great numbers of intelligent and well-educated people turning back to God and His Word. If results mean anything, the Lord has indeed placed His blessing on the great truths revived and once again emphasized and applied in *The Genesis Flood* and the movement which it catalyzed. The results over the past 35 years have been remarkable, and both Biblical and scientific creationism are now alive and well.

Therefore, it is now becoming a cause for concern that a growing number of young-earth creationists are seemingly about to repeat the mistakes and compromises of the past, arguing that the Biblical Flood cannot really explain the geological records after all. Some are concluding that the Tertiary formations are to be attributed to a number of post-Flood geological catastrophes, and some are even alleging that the Flood can only account for the Paleozoic rocks, or maybe not even all of these. Some are also suggesting that at least a portion of the fossiliferous Proterozoic rocks. were laid down by episodic events of some kind before the Flood.

If such equivocations continue, the Flood itself will eventually be used only to account for the marine strata of the Cambrian and Ordovician "periods." Sooner or later difficulties will be found even in these, and the Flood will once again (as so often in the past) be explained away as only a tranquil flood or a local flood. Some (e.g., Davis Young, Glen Morton) have already gone this whole route, starting out not too many years ago as full-fledged Flood geologists but then allowing supposed geological difficulties gradually to relegate the Flood to only a trivial part, if any, of the geologic column.

There are, indeed, still many unresolved geological problems in the Flood model of geology and recent creationism, but there are many more serious Biblical problems with the uniformitarian old-earth model. For those of us who really believe the Bible to be God's inerrant Word, *that* premise ought to govern our interpretations of the geologic data. We should *not* allow the latter to determine how we interpret the Bible!

Consequently, we need to look carefully first of all at the Biblical reasons for understanding the great Flood as the cause of all-or at least most-of the geological record of earth history. For simplicity we can still call this record the geologic "column," even though the term itself may be a misnomer. Such recent writers as Froede (1995a) and Walker (1994) have at least proposed tentative Flood-stage models for the various systems of the so-called standard geologic column.

The Bible and the Geologic Column

Consider first the world before the Flood. Although that world had rivers, there was apparently no rainfall (Genesis 2:5), the rivers presumably being fed from controlled artesian springs (Genesis 2:10). The entire world system had been designed to be "very good" (Genesis 1:31), so there could have been no storms or floods. Consequently there were few-probably no-sediments deposited in the antediluvian seas by rivers or any other geological agents.

Some have suggested that certain sedimentary rocks may have been formed on the third day of creation week, when dry land appeared out of the primeval waters (Genesis 1:9), though this seems unlikely. Whatever processes God may have used in forming the various systems and structures of the earth during creation week, He stopped using when the week and His work were finished (Genesis 2:1-3), so that we cannot use present processes of sedimentation as indicative in any way of the miraculous processes He was using then. At the very least, since plants and animals were not created until later, no fossils were formed on that day when the lands appeared, or apparently on any later day during the week of creation.

Although men and women began to die after Adam's sin, they still lived to great ages, and this was probably true of the larger animals as well. How their bodies were disposed of after death, the Bible does not say, but there seems no way they could ever have been preserved as fossils at least in any significant numbers. Consequently, it seems unlikely that *any* of the geologic column-not even the sedimentary rocks of the Proterozoic-could have been formed before the onset of the great Flood. It is barely possible that certain "trace fossils" in the Precambrian rocks may eventually prove to represent an antediluvian environment formed before the Flood and later buried and preserved by the onset of the first Flood sediments.

With the coming of the Flood, however, this antediluvian economy was drastically changed and the greatest regime of death and destruction the world has ever known came on Planet Earth. In "the same day were all the fountains of the great deep broken up, and the windows [or 'floodgates'] of heaven were opened. And the rain was upon the earth 40 days and 40 nights . . . and the mountains were covered. And all flesh died that moved upon the earth. . . . All in whose nostrils was the breath of life, of all that was in the dry land, died. And every living substance was destroyed which was upon the face of the ground, both man, and cattle, and the creeping things, and the fowl of the heaven" (Genesis 7:11-23).

That is only a portion of the dreadful eye-witness record in Genesis, as kept probably by the sons of Noah in the ark (Genesis 10:1). Job said later that the terrible flood waters had "overturned the earth" (Job 12:15). Jesus said that "the Flood came and destroyed them all" (Luke 17:27), and Peter said that "the world that then was, being overflowed with water, perished" (II Peter 3:6).

There has never, in all human history, been another event remotely comparable to this cataclysmic worldwide flood. If the Biblical record is true and understandable-and *all creationists ought to believe this*-the greatest quantity and extent of erosion and sedimentation in world history must have been caused by the Flood, and therefore also the greatest amount of fossilization.

All this, of course, was still further augmented by great tectonic and volcanic activity, when "all the fountains of the great deep were broken up" (Genesis 7:11). Still more geologic activity occurred in the latter stages of the Flood, after the first 150 days, when "God made a wind to pass over the earth, and the waters assuaged; The fountains also of the deep and the windows of heaven were stopped, and the rain from heaven was restrained; And the waters returned from off the earth continually" (Genesis 8:1-3). The waters continued to go down for another five months before those in the ark, resting on one of the Ararat mountains (probably present-day Mount Ararat, the highest peak in the very mountainous region in eastern Turkey, a volcanic mountain now 17,000 feet high), could even see the tops of other high mountains nearby (Genesis 8:5).

The "assuaging" of the waters, as they drained rapidly off into new ocean basins (with, no doubt, much additional erosion and deposition of sediment) was caused by great tectonic uplifts, as described in Psalm 104:6-9:

> Thou coverest [the earth] with the deep as with a garment: the waters stood above the mountains. At thy rebuke they fled; at the voice of thy thunder they hasted away. They go up by the mountains; they go down by the valleys unto the place which thou hast founded for them. Thou hast set a bound that they may not pass over; that they turn not again to cover the earth.

The phrase "go up by the mountains" can as well be translated "the mountains go up," and many versions so render it. The total picture is one of rapid orogenies and high velocity run-off as the mountains rose up. This phase of the effects of the Flood has been discussed in the recent articles by geologist Carl Froede (1994, 1995b).

The end result of such tremendous geologic upheavals (hydraulic, volcanic, tectonic, atmospheric) is that, as Peter says: "The world that then was, being overflowed [literally, 'cataclysmed'] with water, perished." There could never have been greater death and burial of plants and animals in flood and volcanic and wind sediments in all world history than during this uniquely devastating cataclysm. Surely, the great majority of fossils now entombed in the sedimentary rocks of the earth's crust must be attributed to the Flood, at least as far as the Bible is concerned.

The Bible does mention other great catastrophes such as earthquakes and local floods. But these were all *local* and *brief* in duration-in no way comparable to the mountain-covering, year-long Flood of Noah's day. There is even the record of the long day in the time of Joshua, when presumably the earth's rotation slowed to a stop, then started up again, making the daylight last twice as long as on an ordinary day (see Joshua 10:11-14). Again, however, though the effects may have been global, they lasted only one day and probably involved very little geological disturbances, especially if the deceleration occurred gradually instead of instantaneously.

There is, of course, a very brief reference to a time when "the earth was divided" in the days of Peleg, who was presumably born 101 years after the Flood, assuming no gaps in the genealogical chronologies of Genesis 10 (note especially Genesis 10:25 and 11:10-16). Some young-earth creationists suggest that this statement may refer to a splitting and separation of one great post-Flood continent into the seven continents and many islands of Earth's present geography, resulting in a worldwide visitation of volcanic eruptions and destructive tsunamis.

It seems very likely, however, that such a monumental event as this, producing the planet's new continental/oceanic configurations in a brief time, as well as another global devastation like the Flood itself, would be given a much more prominent description in the Bible than a few words in one single verse! Not too much later, for example, God's Word devotes a whole chapter (Genesis 19) to the much smaller geological catastrophe of the destruction of Sodom an Gomorrah. The latter catastrophe is also mentioned several times in later books of the Bible, but nowhere else is there even a hint of the continents splitting and moving apart.

There have indeed been other later floods, earthquakes, landslides, and other geological catastrophes in Earth history, and some of these no doubt left much death and even occasional fossils in their wake. In a recent book, Eric von Fange (1994) has compiled an impressive list of Scripture verses that speak of violent catastrophes, some of which probably refer to post-Flood residual catastrophism. These were all relatively local and brief, however, warranting only superficial mention in the Bible. As far as God's Word is concerned, the great Flood of Genesis must have produced many times more fossils than all the others combined. Everything else is trivial in relation to the geological effects of the Flood (these effects include the resulting glacial period and other residual catastrophism). The Pleistocene Ice Age, for example, was caused by the Flood, as an after-effect. This has been shown very persuasively by meteorologist Michael Oard (1990).

The record of the Flood does not specifically mention the death and fossilization of marine animals, but this phenomenon must have been very widespread, with the breaking-up of all the fountains of the great deep. The record *does* state, of course, that "all that was in the dry land died" (Genesis 7:22). Every terrestrial mammal, every reptile, every bird, every amphibian, died. Undoubtedly many of these were trapped in the great shifting sediments and eventually buried and fossilized. If any later floods or landslides preserved a few land animals as fossils, the Genesis Flood must have buried and preserved enormous numbers.

This would not necessarily be the case with human beings, however. More than any other creatures, men and women would be able to escape burial in sediments - by running, swimming, climbing, floating on rafts, etc. - even though they would finally have drowned in the Flood waters. Their bloated, floating bodies would seldom have been trapped in the underwater sedimentation. Fossilization normally requires rapid and permanent burial, in addition to death, and relatively few humans, in comparison to land animals, would be preserved as fossils. Any that were preserved would probably never be found, with any remains scattered throughout the enormous volume in the global sediments laid down during the Flood.

Science and the Geologic Column

Remember that the geologic column is largely an artificial construct, not existing as a whole in any one location. *Local* geologic columns do exist, however, and it is these that preserve the remnants of geologic history.

In general, the few distinct geologic "ages" represented in any given local column actually reflect the habitat elevations and ecological communities that once existed at that location, or else at the location from which they had been transported-possibly *en masse.* That is, *other factors being equal,* they would be deposited in the same communities of organisms with which they had lived and roughly in the same relative elevations at which they had lived, even though transported considerable distances. Marine invertebrates would tend to be buried at low elevations, fishes at higher elevations, amphibians at the original interface between sea and land, reptiles a little higher, birds and mammals still higher. Marine sediments would be deep down in the column, land sediments at the top, other things being equal.

This is exactly the order usually found in each local column. Many exceptions to this generalization can be found, of course, due to hydrodynamic sorting, reworking and mixing of sediments, etc., but this is the usual order. Furthermore, the older ideas of the uniformitarians, who thought that every formation was laid down very slowly over long ages, are rapidly being abandoned by the modern school of geologists. More and more it is acknowledged that *all* geologic events now preserved in the geologic column must have occurred very rapidly. For those who still think in terms of slow processes, note the following typical statements from leading evolutionary geologists-geologists who still believe in evolution, but in a catastrophic (or *episodic)* context rather than one of uniformitarianism.

The British geologist, Derek Ager, has been in the vanguard of this neo-catastrophist movement. He said:

> . . . the evolution of continents and of the stratigraphical column in general, has been a very episodic affair, with short "happenings" interrupting long ages of nothing in particular (Ager, 1993a, p. 132).
>
> In other words, the history of any one part of the earth, like the life of a soldier, consists of long periods of boredom and short periods of terror (p. 141).

In Ager's last book, written shortly before his death, he noted that:

> . . . we cannot escape the conclusion that sedimentation was at times very rapid indeed and that at other times there were long breaks in sedimentation, though it looks both uniform and continuous (Ager, 1993b, p. 49).

Ager noted two interesting examples of catastrophism, among many others.

> Probably the most convincing proof of the local rapidity of terrestrial sedimentation is provided by the presence in the coal measures of trees still in position of life (p. 47).
>
> One of the most remarkable geological sights I have ever seen was at Mikulov in Czechoslovakia, where an excavation in Danubian loess shows the remains of literally dozens of mammoths (p. 51).

These mammoth fossils deposits, of course, are only one example of multitudes of fossil graveyards all over the world. In fact, as we have noted, the geological "ages" are identified by their fossil contents, and the very existence of fossils-particularly of any size-requires catastrophic burial.

In a review of Ager's last book, a geologist at the Paleontological Research Institution near Cornell University in Ithaca, New York, has made the following cogent observations.

> Indeed geology appears at last to have outgrown Lyell. . . . The last 30 years have witnessed an increasing acceptance of rapid, rare, episodic, and "Catastrophic" events.
>
> The volume is the summation of a lifetime of global geological work by one of the most influential stratigrapher-paleontologists of his generation, a highly eclectic compilation of the author's geological observations from around the world in support of the general view that the geological record is dominated not by slow, gradual change, but by episodic rare events causing local disasters, . . . this volume may mark the arrival of catastrophism at the status quo (Allmon, 1993, p. 122).

Previously, Robert Dott, prominent American geologist, had made the same point in his presidential address to the Society of Economic Paleontologists and Mineralogists.

> . . . the sedimentary record is largely a record of episodic events rather than being uniformly continuous. My message is that episodicity is the rule, not the exception (Dott, 1982, p. 16).

A leading European geologist rejects uniformitarianism in favor of what he calls "actualistic catastrophism."

> In my presidential address to the International Association of Sedimentologists, I pointed out the

> fallacy of the Lyellian dogma and coined the term actualistic catastrophism (Hsu, 1990, p. 310).
>
> Catastrophism is enjoying a renaissance in geology. . . . Many of us are accepting that unusual catastrophic events have occurred repeatedly during the course of Earth's history (Hsu and McKenzie, 1986, p. 11).

A prominent younger paleontologist calls uniformitarianism an albatross.

> Our science is too encumbered with uniformitarian concepts. . . . Detailed paleo-environmental data tell us that the past is the key to the present, not vice versa (Kauffman, 1987, p. 531).

Another influential American geologist lists and describes many fallacies of uniformitarianism, and makes the following observation.

> The idea that the rates or intensities of geological processes have been constant is so obviously contrary to the evidence that one can only wonder at its persistence (Shea, 1982, p. 457).

Similar quotations and examples could be multiplied at great length (Austin, 1984). Although many geologists continue to harbor a sort of emotional attachment to uniformitarianism in the old Lyellian sense, the facts of geology are against them, and this realization is leading to a plethora of literature on mass extinctions, asteroid impact, climatological revolutions, and other catastrophic "rare events." Nevertheless, they all with one voice continue to reject the global Flood of Noah's day, and continue to believe in long ages and evolution. They are almost neurotically afraid of being associated with the Bible and Biblical creationists. Derek Ager was particularly insistent on this distancing posture.

> This is not the old-fashioned catastrophism of Noah's flood and huge conflagrations. I do not think the bible-oriented fundamentalists are worth honoring with an answer to their nonsense [this is an easy way of ignoring the overwhelming evidence in favor of our "nonsense"- *writer*]. No scientist could be content with one very ancient reference of doubtful authorship [Ager's easy way of ignoring the overwhelming evidence for the divine inspiration of the Bible - *writer*] (Ager, 1993b, p. xix).*

As Ager (and all the others quoted above) imply, the catastrophes they are postulating are intermittent, local or regional - sometimes even global - catastrophes, but they are all assumed to be separated from each other by millions of years when nothing much was happening geologically. They each may have caused mass extinctions, which they assume provided opportunities for the evolutionary "punctuations" so urgently needed by modern evolutionary biologists, in the absence of true transitional forms in their billions of fossils.

These geological "gaps" have left little or no legible record, except the necessity to provide time for evolution.

> Thus it appears that indeed the geological record is exceedingly incomplete. . . . If erosion and other ravages of time are the cause of the missing record, one should expect the incompleteness to increase with age. This, however, is not the case, and the explanation cannot be so simple (Van Andel, 1981, p. 397).
>
> The geological record may thus be a record of rare events separated on any time scale by numerous and long gaps (p. 398).
>
> I maintain that a far more accurate picture of the stratigraphical record is of one long gap with only very occasional sedimentation (Ager, 1993a, p. 52).

In other words, what we see in the "geologic column" is catastrophism. What we *do not see* is the long ages when nothing was happening in between the catastrophes.

Except, that is, when macro-evolution must have been happening, and happening so rapidly that no intermediate forms could be fossilized to provide any evidence that it was happening. So the story goes.

At one time in the honored past, science was supposed to be based on sound factual data, on observation and experimentation, not on the metaphysical speculations which evolutionists would pass off as science today. Many Uniformitarians have finally been willing to admit that Lyell was wrong, because all geologic observations bear witness of catastrophe, not uniformity with the present. But they still cling to the notion of *unobserved* millions of years in between their catastrophes.

The reason why they must do this, of course, is that they would otherwise have to give up their evolutionism as well as their uniformitarianism. Other than this, there is no truly objective reason why all these individual catastrophes could not be merged into one gigantic global cataclysm, exactly as described in the Bible!

As a matter of fact, this is exactly what the evidence indicates. That is, there are no physical, chemical or structural differences between the different "ages." As mentioned before, there are limestones, shales, sandstones, basalts, faults, folds, thrusts, marine formations, etc., in rocks of every assigned "age." There are the same metals and minerals in rocks of every age.

The only differences are in the fossils and, as we have seen, the "ages" are based on special index fossils. Every phylum of animal life is represented in every "age," as well as most classes and orders. Many-probably most-taxons extend through many ages, so not even fossils are useful in age-dating, in most cases. The index fossil assemblages that are used, as we have noted, are essentially arranged in accordance with evolutionary presuppositions. Yet the resulting fossil record is, as we have also noted, taken as the best evidence for evolution.

All of this adds up to the fact that there is no real evidence for the geologic ages except evolution, and no real evidence for evolution except the geologic ages. In any other field of science, such a system would be called flagrant circular reasoning. There is, therefore, no real evidence that the entire geologic column (to the extent that it actually exists) could not have been formed in a single worldwide complex of catastrophes extending over a relatively short duration of

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*Dr. Ager once wrote to the writer, complaining about my quoting him, and wanting me to know that he did not believe in creationism or in *Biblical* catastrophism. I had never implied that he did, of course, but his evidence for catastrophism was worth noting.

time, finally comprising a unique hydraulic/volcanic/tectonic cataclysm. This, of course, is also what the Bible teaches.

No Time Break in the Geologic Column

There is one other very important point to note in this connection. The geologic column, as it has been constructed, is supposed to have worldwide validity, with each early age (i.e., lower in the column) grading into the next age above it. Even though the complete column exists nowhere, it is argued that one can locate adjacent regions where the uppermost layers in a formation truncated by erosion in any given local column will grade upward into the lowermost layer in an adjacent overlapping column, and so on. In this way, as noted before, "there is established in detail the stratigraphic succession for all the geologic ages" (von Engeln and Caster, 1952, p. 417). Although there may be a local "unconformity" at the erosion surface (whereas a "conformity" would indicate uninterrupted deposition), such an unconformity would only extend a limited distance before grading into a conformity.

At one time, in the early 19th century especially, it was believed that each of the major periods was separated from those above and below it by worldwide "unconformities," assumed to be erosion surfaces representing unknown durations of time. Thus the Cambrian Period was separated everywhere from the Ordovician Period above it by a worldwide break in the stratigraphy, marking a time period of unknown length. There are, of course, many *local* unconformities, which may well represent time gaps, or even boundaries between "ages," in various *local* columns.

It is now known, however, that there are no *worldwide* unconformities, and therefore *no worldwide time gaps*, in the standard geologic column. Deposition of sediments continued at some point or points in the world throughout the entire period of deposition of the geologic column on the crystalline basement rocks, at least until reaching the still unlithified sediments near the surface.

This is an important point, so needs documentation. Note a few such confirmations.

> The employment of unconformities as time-stratigraphic boundaries should be abandoned. . . . Because of the failure of unconformities as time indices, time-stratigraphic boundaries of Paleozoic and later age must be defined by time,-hence by faunas (Wheeler and Beasley, 1948, p. 84).

Here it is once again! Geologic ages are marked by their fossils, and nothing else—not by unconformities, not by type of rock, not by superposition or anything else-only by fossils on the basis of their assumed stage of evolution, or location in the Great Chain of Being.

> It is widely acknowledged that chronostratigraphic units [that is, geologic systems representing a given age] . . . do not coincide everywhere with the diachronous boundaries of lithostratigraphic and biostratigraphic units [that is, specific geologic formations] (Lucas, 1985, p. 764).

> Many unconformity bounded units have been erroneously regarded as lithostratigraphic units, even though they are characterized not by lithologic unity but by the fact of being bounded by unconformities. . . . Similarly, many unconformity-bounded units have been erroneously considered to be chronostratigraphic units in spite of the fact that unconformity surfaces are apt to be diachronous [that is, crossing supposed time boundaries] and hence cannot constitute true chronostratigraphic boundaries (Chang, 1981, p. 23).

Finally, Dr. Amos Salvador, Chairman of the International Subcommission on Stratigraphic Classification, has said:

> Bounding unconformities were the basis for establishing many of the earliest stratigraphic units, recognized in western Europe. Many of the systems of the presently accepted Standard Global Chronostratigraphic Scale were originally unconformity-bounded units. This procedure has not been restricted, however, to the earliest days of stratigraphic work or to western Europe; it has been used, and continues to be used, in all parts of the world. Unconformity-bounded units became very popular at the time tectonic episodes were considered essentially synchronous worldwide, but did lose favor among geologists when synchroneity was found not to hold true (Salvador, 1987, p. 232).

It is evident that, if unconformity surfaces are not isochronous surfaces and do not extend worldwide, there is no worldwide time gap in the geologic column. For example, somewhere the middle Ordovician grades conformably into the upper Ordovician and somewhere the upper Ordovician grades into the lower Silurian, and so on. The deposition of the entire column-whether or not it is believed to represent the geologic ages-proceeded from bottom to top (Proterozoic through Tertiary) with no worldwide interruption in its deposition.

That being true (and it is), and if also every deposit has been formed very rapidly (as the neo-catastrophists now recognize), then it follows as day follows night that *the entire column was formed rapidly!* If all formations represent local catastrophes, as acknowledged now by Ager and most other active geologists, then they must all be interconnected and essentially continuous, forming the tremendous record of a global hydraulic/volcanic/tectonic cataclysm-nothing less than the great Flood of the Bible!

Attempts to Reduce the Scope of the Flood

One can, of course, find many-difficulties in applying Flood geology to the entire geologic column. These become especially troublesome in trying to correlate all the local columns of the world with each other and all within the context of one global Flood.

Biblical creationists are understandably tempted frequently, when they undertake such studies, to abandon their attempts, reverting back to the old Cuvierian ideas of multiple global catastrophes, yet trying somehow to confine them all within the Biblical chronology of several thousand years since the Genesis creation week. Some have gone back even further, giving up the literal creation-and-flood record altogether, in reverting either to progressive creationism or even to theistic evolutionism.

Such backsliding, however, requires more distortion of Scripture than any Bible-believing Christian should ever consider. It is far easier, as well as more realistic in the light of eternity, to reinterpret the geologic data in light of God's revelation.

It should be remembered that a uniformitarian approach, even to these catastrophic data, flies directly in the face of the warning in II Peter 3:3-6 that such an approach constitutes "wilful ignorance." The Flood was unique in size, in scope, in complexity and in duration-not to mention its control by divine providence, possibly even miraculous in some degree-so much so that it cannot really be compared with later geological processes-not even other major geologic catastrophes. To say that such-and-such a local geologic formation or sequence cannot be assimilated in a Flood explanation is to say more than one can prove. We cannot know all that was happening during the Flood year, and it is spiritually presumptuous to think we can. It is all right to speculate, but such speculations must be constrained within the limits imposed by God's Word, taken as a literal and perspicuous historical record of what happened. It is encouraging that a growing number of younger geologists are now attempting to do just that (e.g., Woodmorappe, Oard, Froede, Walker, and others).

The plain inference of the Bible that the geologic deposits of the Flood were orders of magnitude greater than those of any supposed later catastrophes, supported by the geologic evidence that the complete geologic column, Proterozoic through Tertiary, was formed by continuous catastrophic deposition, would seem to make it mandatory that Bible-believing Christians interpret these deposits as Flood deposits either laid down during the Flood year or during its continuing after-effects.

There are certain other geological considerations, as compared with Biblical statements, that still further strengthen this requirement. The Mesozoic strata, with their great numbers of fossils of dinosaurs and other reptiles, as well as the Tertiary strata, with their extensive mammal fossils, must have been deposited by the Flood, in view of the Biblical stipulation that all land animals died in the Flood (e.g., Genesis 7:22).

The suggestion made by certain creationists (actually young-earth creationists who do believe in the global Flood) that only the Paleozoic strata should be attributed to the Flood, is clearly refuted by that Biblical statement. How could relatively trivial later catastrophes* produce vast numbers of land-animal fossils when the immensely greater global Deluge produced practically none? Those who advocate this type of scenario would have to assume that the Flood only *drowned* all the animals, *not burying any* in the Flood sediments. As for the sediments, worldwide and a mile deep on average, did these sediments carefully avoid all land animals and entomb only those in the ocean? Many of the latter, being accustomed to life in the water, ought to be able to escape burial more effectively than land animals, but both fish and marine invertebrates were entrapped by the billions.

Actually, the Bible does not even mention that any marine animals died at all, and many did continue living right through the Flood year (Noah did not have to take marine animals on the ark, as they could survive without it). The Genesis record only tells us that all land animals died in the Flood.

Furthermore, there is an abundance of marine deposits and marine fossils dated Mesozoic and Tertiary also, as well as Paleozoic. Some of these are very extensive, covering vast areas; in fact, the index fossils for both Mesozoic and Tertiary periods are mainly marine animals. Were these extensive deposits also post-Flood? Were there later eruptions of the fountains of the great deep which could produce these marine fossil beds on the continents as well as those of the Paleozoic? The Bible certainly does not hint any such thing. If not, then, just how *could* they have been formed? Nothing like this has been recorded in all human history (which means all post-Flood history). Any great post-Flood upheavals that would generate the vast Mesozoic and Tertiary deposits (and these are worldwide in occurrence!) would surely have merited some kind of significant Biblical description if they really had occurred. The Bible mentions various later earthquakes, but nothing like this. The account of the great Flood involved most of four chapters of the Bible, plus a number of references later in the Bible. Why is there no clear reference to these other catastrophes at all?

Furthermore, some of these Tertiary marine deposits became vast rock formations which were quarried by early post-diluvian nations for their construction projects. A prime example of this is the Great Pyramid of Egypt, erected not more than a few centuries after the Flood. It was built of huge blocks of well-lithified nummulitic limestone, containing great numbers of well-preserved nummulite fossils. Nummulites were foraminifera, one-celled marine fossils usually dated Eocene or later, found in abundance especially in the Mediterranean area. It would seem very clear that at least *these* Tertiary deposits must have been laid down and lithified in the Flood itself, not some hypothetical post-Flood flood.

We need to recall that the Apostle Peter, in his last few words before his martyrdom, warned Christians living in the last days not only about the dangers of naturalistic uniformitarian thinking (II Peter 3:3-6) but also about the lethal danger of distorting the plain meaning of God's Word in order to accommodate that naturalistic way of reasoning, "which they that are unlearned and unstable wrest, as they do also the other scriptures, unto their own destruction" (II Peter 3: 16). Peter said, by divine inspiration, that the real answer to the wilful ignorance of the uniformitarian evolutionists is in the great Flood, "Whereby the world that then was, being overflowed with water, perished" (II Peter 3:6)-not in some hypothetical pre-Flood or post-Flood catastrophes about which the Scriptures are silent.

If we try to insert some sort of additional worldwide catastrophe or catastrophes into Genesis 1:9 or Genesis 10:25 or Joshua 10:13 or Job 38:8 or Psalm

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*The Bible clearly states that the great Flood would never be repeated in scope (e.g., Genesis 9:11, 15). Any later catastrophe must therefore be trivial in relation to the Noahic deluge.

104:6 or any of the other verses that have been misused like this, merely in order to sidestep certain problems in Flood geology, are we not in danger of ignoring Peter's warning about wresting Scripture? It is better to leave some geological problems for further study than to let uniformitarian pseudo-science and our own limited understanding dictate our Biblical interpretations. "For the word of the LORD is right; and all His works are done in truth" (Psalm 33:4).

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PANORAMA NOTES

Hairy Pterosaurs *(Sordes pilosus)*- A Progress Report

In 1971, A.G. Sharov of the Soviet Academy of Sciences discovered a fossil pterosaur which was given the name *Sordes pilosus,* meaning "filthy fur" (Desmond, 1977, p. 192).

In recent works Unwin and Bakhurina (1994) and Hect (1994) describe the covering on the wings as wing fibers. The wings in this specimen seemed to cover most of the rest of the body in death. These fibers are viewed to be structures that strengthened the wing. Unwin has not seen any evidence to date of hair, while Kevin Padian of the University of California at Berkeley says he has seen fossils with body hair (Hect, 1994). How does this argument affect creation? Clearly, concerning the non-body hair situation, no problem arises. However, would a problem arise if there were a hair-like covering on *Sordes pilosus?* I feel the answer is undoubtedly not. Creation's answer would lie in the law of symmetric variation and the gene-theme model (Brown, 1987). God could have created such a creature with a hair-like covering, or because it had the genetic make-up within its genome, individuals with the right type of genetic change could have introduced a variation within those genes to produce a hair-like covering.

The kind's genetic variation potential is enormous. In man for example the variation potential is greater than the number of atoms in the known universe (Ayala, 1978, p. 63). All this variation potential exists without ever going beyond the kind.

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Colin Brown*

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*61 Derby Road, Golborne, Warrington WA3 3LE, England.

CRSQ Volume 24

The *Creation Research Society Quarterly* has been published since 1964 (32 complete volumes). In an effort to make these volumes available, all of the missing issues have been reprinted. Brief synopses have been written on volumes l-23 and have appeared in the previous 23 Quarterlies. In each synopsis, major articles and notes are reviewed to give a person interested in scientific creationism a general idea of the contents of that volume. Many of the articles are of continuing interest and value.

Botany

A discussion of horsetails *(Equisetum* sp.) was given from the perspective of design (Howe, Williams and White, 1987, pp. 141-143). This organism absorbs SiO_2 in its cell walls and has been used to scrub pots and pans in the past. Scanning electron microscopy and energy dispersive x-ray analysis enhanced the study. A note emphasized that begger tick seeds sprouted after being submerged in salt water for 350 years (Howe, 1987b, p. 144). This circumstance has application to possible seed survival during the Flood. George Howe (1988, p. 186) briefly challenged creationists to help the Society in building a herbarium collection. The data obtained from the study of such specimens could be used in developing a recent Flood/climatic-change model of origin for plants. Cockman presented a paper (1988, pp. 187-193) on how to properly collect plants for the herbarium. Lammerts wrote a penetrating review (1988, pp. 194-196) of an article which advanced the thesis of evolution of land plants.

Genetics

Colin Brown continued his postulations (1987a, pp. 75-80) on a creationist model of genetic variation. A brief review of an ICR M.S. thesis on molecular homology was given by Williams (1988a, p. 185).

Zoology and Related Topics

An interesting article on whether octopus and human eyes are actually examples of convergent evolution in action was written by Hamilton (1987a, pp. 82-85). The author concluded that the origin of the structures is best explained from the design standpoint. Butt (1987, p. 86) outlined some problems evolutionists have when discussing the origin of certain functions in insects. An exchange of ideas on a creationist study of insects was elucidated by Wells (1988, pp. 209-210) and Howe and Sanders (1988, pp. 210-212). A defence of William Paley's watchmaker concept (design) in relation to some recent naturalistic writings on the subject was presented (Hamilton, 1987b, pp. 144-145).

An important series on Shiva Temple was featured in this volume. Shiva Temple, a butte in the Grand Canyon, was the location of a 1937 American Museum of Natural History expedition. The purpose of the study was to search for the possible evolutionary development of animals isolated on the butte. John Meyer offered a fascinating history (1987, pp. 120-125) of the project and noted, "Thus Shiva's status as an isolated 'sky island' was called into question to explain embarrassing lack of support for evolutionary theory" (p. 124). Then Meyer and George Howe conducted a field study (1988, pp. 165-172) under dangerous conditions to determine if Shiva Temple is isolated from the north rim of the Grand Canyon for some small mammals. They concluded that the "gene flow" from the canyon rim to the butte ". . . is highly limited or totally absent" (p. 169). Also they speculated that the length of time of isolation of small mammal populations on the butte had been quite brief. This possibility would explain why there was no noticeable variation detected among the animals examined during the 1937 expedition. Likewise this implies that the Grand Canyon was formed recently.

Anthropology

DuBois (1987, pp. 117-119) analyzed previous discussions of australopithecines by creationists and anticreationists. The "gutter science" of a particular anticreationist was exposed.

Astronomy

The effect of non-uniform density on solar contraction energy was noted (Benton, 1987a, pp. 145-147). The conclusion reached was that possibly solar contraction could account for the energy generated by the sun. DeYoung (1988, pp. 193-194) reviewed some postulations on star formation and explained that ". . . little is really understood about stars and galaxies" (p. 194). The advantages of believing in the creation of the heavens rather than some naturalistic scheme were mentioned.

Education

John Moore offered his views on properly defining evolution in a previous volume (1986, pp. 110-112). The discussion continued in this volume of the Quarterly (Holt, 1987b, p. 44; Leitch, 1987, pp. 44-45). Also see de Pierre (1988, pp. 215-216). The topic involved macroevolution, microevolution and variation. A. W. Mehlert wrote an excellent extensive review (1987, pp. 23-33, 92-102) of an anticreationist book. The evolutionary speculations and attacks on creationist reasoning were carefully refuted. Topics explored in the review were origin of matter and the universe, organic evolution, thermodynamics, lack of transitional forms, problem of species, speciation and allopatry, living fossils, macroevolution, the origin of life, Noah's ark and the Flood, Flood geology, radiometric dating and the age of the earth, oil and coal, cosmic dust, size and structure of the universe, continental drift, the horse family, reptile to bird evolution, origin of the feather, evolution of mammals, synapsids, the ear and the origin of man. Readers are urged to consult this review which exposes the shallow arguments of anticreationists. Later Mehlert (1987b, pp. 156-157) outlined some more problems with the evolutionary hypothesis on the subjects of origin of the universe and anthropology. An interesting opinion on extinction of species was offered by Lammerts (1987b, p. 157). Watson (1987, p. 157) noted how language degenerates rather than evolving upward.

The Fossil Record

Wik (1987, p. 14) commented on the fact that barbed wire laid along beaches in Norway by German occupation forces in the 1940's was covered later with wind-blown sand. After winter storms in 1981 uncovered some of the wire, it was found that the buried wire had been transformed into lumps of sandstone sediment, an example of rapid lithifaction or petrifaction. Three notes in this volume presented creationist interpretations of *Archaeopteryx* and *Protoavis* (Kaufmann, 1987, pp. 80-82; Brown 1987b, pp. 143-144; Calais and Duffett, 1988, pp. 183-185) in readily understandable language. The final part of the research report on the pollen grains found in Hakatai Shale, Hermit Shale and the Supai Formation in the Grand Canyon region was published in this volume (Howe, Williams, Matzko and Lammerts, 1988, pp. 173-182). Optical and scanning electron microscopy of the pollen present in the rock were featured. The type of pollen found indicates that the rock layers are possibly not as old as postulated by uniformitarian geologists.

Geology

Edmond Holroyd (1987, pp. 15-16) introduced a concept into creationist geological thought concerning missing talus. Basically he explained that many cliffs and mesas in the western U.S. have been eroded but there is no evidence of talus below the slopes. He offered several suggestions as to what happened to the talus. Catastrophic removal of the eroded debris during and after the Flood is a reasonable explanation for the phenomenon. Williams (1987, pp. 18-19) discussed the rapid development of calcium carbonate formations in nature and referred to the previous work he and other investigators performed on the subject. A spirited exchange on this topic was recorded in a later Quarterly (Wise, 1988, pp. 212-213; Williams, 1988b, pp. 213-215). Lammerts (1987a, p. 46) continued his bibliography of recorded instances of wrong-order geological formations (overthrusting). Morton (1987b, pp. 154-156) defended his geological concepts after receiving criticism from Woodmorappe (1986, pp. 79-83). Later Woodmorappe explained his Flood model in more detail (1988, p. 209). Lyndell Brown (1988, pp. 207-208) pointed out that a vapor canopy would more likely exist on an expanding earth.

Orogeny (Mountain Building)

A minisymposium was conducted in the Quarterly offering different interpretations on this topic and the various contributors were allowed to cross-examine each other at the end of each presentation. The various papers were:

- Mountain moderated life: A fossil interpretation (Howe, 1987a, pp. 9-12)
- Mountains and leeside climate: An indicator of change (Nash, 1987, pp. 12-14)
- Mountain synthesis on an expanding earth (Morton, 1987a, pp. 53-61)
- Mountains-a tidal (astronomical flyby) phenomenon (Patten, 1987, pp. 61-69)
- Mountains, meteorites and plate tectonics (Northrup, 1987, pp. 125-129)
- The mechanisms for mountain building from a creationist perspective are not yet understood (Waisgerber, 1987, pp. 129-136)

Physics and the Young Earth

Gary Johnson (1987, pp. 38-42) presented a model for the firmament (Genesis 1:6-8). Also he speculated how the present heavens will be destroyed (II Peter 3:5-12). Gene Chaffin (1987a, pp. 109-117) prepared an excellent updated review of a survey of dating methods as related to the young earth position. This much needed article offers considerable data useful to creationists. Benton (1987b, pp. 152-154) discussed the proper referencing practices that should be employed when defending the young earth hypothesis. Stutz (1987, p. 158) and Chaffin (1987b, p. 158) outlined some problems for the ancient earth position when considering inclusions found in diamonds. Also some of Robert Gentry's work was briefly examined.

Philosophy

The first treatise on philosophy in this volume was a comparison of Aristotelianism and the philosophy of creationism written by Ellen Myers (1987, pp. 5-9). The so-called enlightenment was presented as actually an endarkenment (Lillo, 1987, pp. 19-23). An extensive quote on relativism by Herberg (1987, pp. 16-17) was published. Two replies to Kofahl's emphasis on redefining distorted science were given in volume 24 (Moe, 1987, p. 42; Holt, 1987a, pp.43-44) along with Kofahl's replies (1987a, b, pp. 42-44). Rusch outlined a creationist philosophy of science using personal examples (1987, pp. 71-75). The metaphysics of modern science was investigated by McGhee (1987, pp. 138-141). He refuted the claim of "neutral" science and rightly noted that "Chance as a mechanism of evolution is detrimental to true science . . ." (p. 138). A revealing quote on the relationship between the philosophy of progress and evolutionism was offered Carson, 1988, pp. 185-186). Parker (1988, p. 208) discussed the destructive effects of the material hypothesis on the medical profession.

This volume of the quarterly contains a variety of topics of interest to creationists. The information content of the material from research activities to philosophical treatises is outstanding.

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Emmett L. Williams*

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*5093 Williamsport Drive, Norcross, GA 30092-2124.

KEYWORD INDEX TO VOLUME 32, 1995-96

EUGENE F. CHAFFIN*

For multi-page items, the reference is to the first page only. Letters following numbers indicate: a = article; L = letter; p = panorama; r = review; and n = note.

ALGAE 142p
AMBER 158a
AMMONITES 88L
ANATOMY 220p
ANT 158a
APES 46r
APOCRYPHA 16r
APPALACHIAN 202a
ARCHAEOLOGY 227r
ARCHAEOPTERYX 18a
AUSTRALOPITHECUS 99p
AUTOMATIC TRANSMISSION 220p
AXEL HEIBERG ISLAND 107a, 138a, 231L, 232L

BACTERIA 142p
BARRIER ISLAND 142p
BEACH 142p
BENTONITE 11L
BIBLE 16r
BIG BEND NATIONAL PARK 101p
BIOLOGIC CHANGE 61r
BIOLOGY TEXTS 25a
BIRD 18a
BLACK BODY RADIATION 17r
BONE, DINOSAUR 11L
BOULDER BEDS 148p
BOYLAN, DAVID 5n
BRISTLECONE PINE 80L, 81L

CADBOROSAURUS 243r
CARBON-14 DATING 80L, 81L
CATASTROPHE 180r
CAULERPA 142p
CANYON FORMATION 29a
CATASTROPHE 29a
CATASTROPHIC PLATE TECTONICS 130L
CATASTROPHISM 148p
CAUSE 118r
CEPHALOTINI 158a
CHANCE 118r
CHANNELED SCABLANDS 242r
CLARK, HAROLD 172r
CLAY 202a
COBE SATELLITE 17r
COMPUTER SIMULATION 107a
COSMOLOGY 17r, 45r, 46r
CREOSOTE 221p

---

*Eugene F. Chaffin, Ph.D., 715 Tazewell Avenue, Bluefield, VA 24605.

CREATION RESEARCH SOCIETY 156n
CREATION EVIDENCE 106r
CREATION, PROGRESSIVE 196L
CREATIONISM 16r, 78r, 117r, 172r, 182r, 215r
CREATIONISTS 7a, 82a, 115r, 172r
CREATION RESEARCH SOCIETY, MINUTES 97n
CREATION SCIENCE 25a, 60r, 215r
CRETACEOUS 13a, 131L, 234L
CREVASSE SPLAY 202a
CROCODILES 107a
CRUST 12L, 130L
CRYPTOZOOLOGY 243r
CURRENTS 82L

DARWINISM 17r, 190a, 240r
DECEIT 43r
DELTA 202a
DENDROCHRONOLOGY 80L, 81L, 170L
DESIGN 16r
DIATOMS 11L, 16r
DIET 126a
DINOSAUR 11L, 13a, 16r, 47a, 231L, 232L, 237L
DINOSAUR BONE, GROWTH RINGS 133a
DNA 61r
DOUGHERTY GAP 202a
DUNES 142p

EPEIRIC SEA 13a, 131L, 232L, 234L
EROSION 29a
EVOLUTION, THEISTIC 196L
EXOBIOLOGY 71a
EXTINCTION 22L, 180r, 216p, 219p
EXTRATERRESTRIAL 71a

FEATHERS 18a
FIRST AMENDMENT 67n
FLOOD 12L, 13a, 21L, 22L, 23L, 47a, 70L, 90a, 171L, 230L, 242r
FLOOD MODEL 130L
FLORA 107a, 142P
FOOT 220p
FOOTPRINTS 47a, 131L
FOREST 142p
FOSSILIZED TREES 107a, 138a
FOSSIL RECORD 60r
FOSSILS 12L, 47a, 88L, 180r, 221p
FOX 157p
FOX SNAKE 157p
FUNGUS 142p

GENETICS 88L, 227r
GENOCIDE 190a
GEOLOGICAL TIMESCALE, CREATIONIST 90a
GEOLOGICAL TIMESCALE, UNIFORMITARIAN 90a
GEORGIA 29a, 202a
GERMINATION 23L
GIANTISM 133a
GIFTS 155n
GLACIER 44r
GOLEM 156r
GRAND CANYON 155r
GREENHOUSE GASES 107a
GREENHOUSE EFFECT 79L
GREEN RIVER 230L
GROWTH 133a
GROWTH RINGS 133a

HAYMOND FORMATION 148p
HEAT 21L, 70L, 199L
HOMINID 174a
HOMO ERECTUS 174a
HOMINID 99p, 132L
HORSETAILS 11L
HOUSETOP MOUNTAIN 148p
HUBBLE CONSTANT 46r
HUMPHREYS, D. R. 45r
HURRICANE 142p
HYPICHINIA 202a

ICE AGE 44r, 90a, 138a
ICHNOLOGY 202
INTERDISTRIBUTARY BAY 202a

JOHNSON, PHILLIP 46r
JURASSIC 18a

KAROO 12L, 21L, 199L, 201L
KIND(S) 157p
KLOTZ, JOHN 189n

LANDSLIDE 197L
LAND SURFACE 23L

MAMMOTH 219L
MAN, ORIGINS 46r
MARATHON BASIN 148p
MARSH, FRANK L. 172r
MASTODON 219L
MAURY, MATTHEW FONTAINE 82a
MEDICINE 126a
MIMICRY 142p
MOUNTAINS 171L
MOUNT SAINT HELENS 142p, 199L
MOUNT USU 142p
MUD 12L, 171L
MUTATIONS 88L

NESTS 13a
NUMBERS, RONALD 172r, 182r

OAK CHRONOLOGY 170L
OCEAN 23L, 171L
OCEAN BASINS 21L, 13a
OCEANOGRAPHY 82a, 133a, 138a
OPAL 11L
ORIGIN OF LIFE 71a

PALEOCLIMATE 47a, 79L, 107a, 138a
PALEOFLORA 138a
PALEOSOLS 107a
PASTEUR 156r
PEER REVIEW 156r
PHILOSOPHY 118r, 228a, 239r, 240r
PHOTOSYNTHESIS 89e
PITHECANTHROPUS 132L, 174a
PLANETS 71a
PLANTS 22L
PLATE TECTONICS 171L, 197L
POISONS 126a
POLLINATION 142p
POTASSIUM-ARGON METHOD 99p
PRICE, GEORGE MCREADY 172r
PSALM 8 82a
PROGRESSIVE CREATION 43a
PROVIDENCE CANYON 29a
PUBLIC SCHOOLS 215r

REPTILE 18a
RIMMER, HARRY 172r
ROCKETRY 7a
ROSS, HUGH 43r
RUSCH, WILBERT H. SR. 78n, 125n

SALTWATER 12L, 23L
SAND 142p
SANDAGE, ALLAN 46r
SANDSTONE 202a
SCIENTISTS 7a, 156r
SEA LEVEL 142p
SEA-FLOOR SPREADING 130L
SEA SERPENT 243r
SEDIMENTARY ROCK 21L
SEEDS 12L, 23L, 142p
SELECTION 61r
SHALE 202a
SHARK 133a
SILICA 11L
SKULL 132L, 174a
SNAKE 157p
SOCIOLOGY 117r
SOIL 22L
SOLE CASTS 202a
SOUTHERN METHODIST UNIVERSITY 17r
SPACE FLIGHT 7a
SPIDER 158a
STARLIGHT 45r
STORM DEPOSITS 143p
SUBAQUEOUS DEPOSITS 101p
SUBDUCTION 130L
SUCCESSION 142p
SUN 43r
SYMBIOIS 142p
SYSTEMATIC THEOLOGY 78r

TASMANIA 190a
TEACHING MATERIALS, ANALYSIS 25a
TEETH 99p, 133a
THEOLOGY 118r
THERMODYNAMICS 60r
TIME 45L
TIMESCALE, see geological timescale
TOXICITY 126a
TRACE FOSSILS 202a
TRANSGRESSION 143p
TRANSITIONAL FORM 18a
TREE RINGS see dendrochronology
THUNDER EGGS 101p
TUFF 99p
TURBIDITY CURRENTS 202a

UFO 71a

VAPOR CANOPY 79L
VAN ANDEL RESEARCH CENTER 28n, 98n, 155n, 156n, 157n, 215n
VARNISH 88L
VARVES 230L
VIDEO 155r
VIKINGS 44r
VOLCANIC DEPOSITS 101p
VOLCANOES 12L, 21L, 70L, 142p, 199L
VON BRAUN, WERNHER 7a
VON KOENIGSWALD 174a

WALTHER'S LAW 202a
WATER 23L, 70L
WESTBERG, V. LUTHER 155n
WHEATON COLLEGE 182r
WILDFLYSCH 148p
WOOD RATS 221p
WORLDVIEWS 117r

ZION NATIONAL PARK 197L

INDEX OF ARTICLES AND PANORAMA NOTES, VOLUME 32,1995-96

EUGENE F. CHAFFIN*

A

Acceptance of Evolution and a Belief in Life on Other Planets, 71
Australopithecus ramidus: The Oldest "Hominid" Yet?, 99

B

Bergman, Jerry
  Acceptance of Evolution and a Belief in Life on Other Planets, 71
  Nineteenth Century Darwinism and the Tasmanian Genocide, 190
  Wernher von Braun: The Father of Modern Space Flight-A Christian and a Creationist, 7
  Why Did God Create Poisons and Toxins?, 126
Biblical Christian Framework for Earth History Research: Introduction to the Series/A, 228
Botanical Highlights, 142
Brook, Robert E.
  Methodology for Analysis of Science Teaching Materials from a Creationist View, 25

C

Carcharodon megalodon: Is This the Antediluvian Great White Shark?, 133
Claims about ***Archaeopteryx*** in the Light of the Evidence/A Review of . . ., 18
Cowart, Jack H.
  Dougherty Gap: Evidence for a Turbidity Current, 202

D

Dauphin Island, Alabama: Evidence for Rapid Erosion, 143
Davidson, Phil L.
  "Pithecanthropus IV": A Human Evolutionary Ancestor or an Artificial Reconstruction?, 174
Deckard, Steven W.
  Methodology for Analysis of Science Teaching Materials from a Creationist View, 25
Dixon, Candace B.
  Methodology for Analysis of Science Teaching Materials from a Creationist View, 25
Dougherty Gap: Evidence for a Turbidity Current, 202

***Eugene F. Chaffin, Ph.D., 715 Tazewell Avenue, Bluefield, VA 24605.**

E

- Extinction and Evolution, 216
- Extinction of Mammoths and Mastodons, 219

F

- Froede, Carl R., Jr.
  - Biblical Christian Framework for Earth History Research: Introduction to the Series / A, 228
  - ***Carcharodon megalodon:*** Is This the Antediluvian Great White Shark?, 133
  - Dauphin Island, Alabama: Evidence for Rapid Erosion, 143
  - Dougherty Gap: Evidence for a Turbidity Current, 202
  - Extinction and Evolution, 216
  - Late Cretaceous Epeiric Sea or Retreating Floodwater?, 13
  - Proposal for a Creationist Geological Timescale / A, 90
  - Thunder Eggs: Evidence for Subaqueous Deposition?, 101

H

- Honor to Whom Honor . . . Matthew Fontaine Maury (1806-1873), 82
- Housetop Mountain Boulder Bed Member Described-Part II on the Haymond Formation, Marathon Basin, Texas, 148
- Howe, George F.
  - Botanical Highlights, 142
  - Housetop Mountain Boulder Bed Member Described-Part II on the Haymond Formation, Marathon Basin, Texas, 148
  - Wood Rats, Plant Fossils, Plovers and the Origin of Creosote Bush Deserts, 221

K

- Kaufmann, David A.
  - Running: The Human Foot Uses Automatic Transmission, 220

L

- Late Cretaceous Epeiric Sea or Retreating Floodwater?, 13
- Lutz, Ernst
  - Claims about ***Archaeopteryx*** in the Light of the Evidence / A Review of, 18

M

- Major, Trevor J.
  - Honor to Whom Honor. . . Matthew Fontaine Maury (1806-1873), 82
- Methodology for Analysis of Science Teaching Materials from a Creationist View, 25
- Mid and High Latitude Flora Deposited in the Genesis Flood-Part I: Uniformitarian Paradox, 107
- Mid and High Latitude Flora Deposited in the Genesis Flood-Part II: A Creationist Hypothesis, 138

N

- Nine New Species and a New Genus of Dominican Amber Ants of the Tribe Cephalotini (Hymenoptera: Formicidae), 158
- Nineteenth Century Darwinism and the Tasmanian Genocide, 190

O

- Oard, Michael L.
  - Mid and High Latitude Flora Deposited in the Genesis Flood-Part I: Uniformitarian Paradox, 107
  - Mid and High Latitude Flora Deposited in the Genesis Flood-Part II: A Creationist Hypothesis, 138
- Overman, Richard L.
  - Methodology for Analysis of Science Teaching Materials from a Creationist View, 25

P

- Peil, Kevin P.
  - ***Australopithecus ramidus:*** The Oldest "Hominid" Yet?, 99
- ***"Pithecanthropus*** IV": A Human Evolutionary Ancestor or an Artificial Reconstruction?, 174
- Proposal for a Creationist Geological Timescale / A, 90
- Providence Canyon, Stewart County, Georgia-Evidence for Rapid Erosion, 29

R

- Reed, John K.
  - Biblical Christian Framework for Earth History Research: Introduction to the Series / A, 228
- Reprinted ***CRSQ*** Volume 20, 56
- Reprinted ***CRSQ*** Volume 21, 101
- Reprinted ***CRSQ*** Volume 22, 178
- Reprinted ***CRSQ*** Volume 23, 224
- Rucker, Brian R.
  - Extinction of Mammoths and Mastodons, 219
- Running: The Human Foot Uses Automatic Transmission, 220

S

- Scheven, Joachim
  - Nine New Species and a New Genus of Dominican Amber Ants of the Tribe Cephalotini (Hymenoptera: Formicidae), 158
- Schneck, Bryan A.
  - Methodology for Analysis of Science Teaching Materials from a Creationist View, 25

T

- Thunder Eggs: Evidence for Subaqueous Deposition?, 101

V

- Vierbergen, Gijsbertus
  - Nine New Species and a New Genus of Dominican Amber Ants of the Tribe Cephalotini (Hymenoptera: Formicidae), 158

W

- Why Did God Create Poisons and Toxins?, 126
- Williams, Emmett L.
  - Housetop Mountain Boulder Bed Member Described-Part II on the Haymond Formation, Marathon Basin, Texas . . ., 148
  - Providence Canyon, Stewart County, Georgia Evidence for Rapid Erosion, 29
  - Reprinted ***CRSQ*** Volume 20, 56
  - Reprinted ***CRSQ*** Volume 21, 101
  - Reprinted ***CRSQ*** Volume 22, 178
  - Reprinted ***CRSQ*** Volume 23, 224
- Wernher von Braun: The Father of Modern Space Flight-A Christian and a Creationist, 7
- Wood Rats, Plant Fossils, Plovers and the Origin of Creosote Bush Deserts, 221

INDEX OF DEPARTMENTS, VOLUME 32,1995-96

George F. Howe*

This title/author index covers the listings under Departments. For items with two or more pages, the reference is to the first page only. After the page number, a letter indicates which type of feature is involved: letter to the editor (L), review (R), cover photo (CP), or other departments (such as laboratory director's comments, dedications, president's remarks, photo essays, etc.) (D).

A

Ammonite/The Puzzle of a Persistent . . ., William Waisgerber, 88 L
Austin, Steven A.
  Response of Reed, Bennett, Froede, and Oard, 197 L

B

Baumgardner, John R.
  Response to Reed, Bennett, Froede, and Oard, 197 L
Bennett, Christopher B.
  Some Initial Thoughts Regarding Catastrophic Plate Tectonics, 130 R
Bergman, Jerry
  Beneficial Mutations? 88 L
  Creation/Evolution Tapes, 87 R
  Darwinism: Science or Philosophy? 240 R
  Extinction: Bad Genes or Bad Luck, 180 R
  God's Own Scientists: Creationists in a Secular World, 115 R
  Systematic Theology: An Introduction to New Testament Doctrine, 78 R
Bergman/Reply to . . ., Lane P. Lester, 88 L
Boylan/Dedication to David, Don B. DeYoung, 5 D
Bristlecone Pine Have Survived a Catastrophic Flood?/Could the . . ., Bruce J. Taylor, 80 L
Brown, R.
  The Creationist Movement in Modern America, 117 R

C

Cadborosaurus- Survivor from the Deep, Bruce Scoggan, 243 R
Chaffin, Eugene F.
  Editors Comments 6, 67, 125, and 189 D
  Genetic Engineering: Dreams and Nightmares, 227 R
  Golem: What Everyone Should Know about Science/The, 156 R
  Teaching Creation Science in Public Schools, 215 R
Chance in Modern Science and Cosmology/Not a Chance-The Myth of . . ., John K. Reed, 118 R
Cosmos/Lonely Hearts of the . . ., Don B. DeYoung, 46 R
Creation/Evolution Tapes, Jerry Bergman, 87 R
Creation: Facts of Life, Wayne Frair, 61 R
Creation, Progressive Creation, and Theistic Evolution/Assessment of World Views: . . ., Walt Sievertsen, 196 L
Creation Science in Public Schools/Teaching . . ., Eugene F. Chaffin, 215 R
Creation/Why I Believe in . . ., Don B. DeYoung, 106 R
Creationism/Biblical . . ., Don B. DeYoung, 164 R
Creationism in Twentieth Century America, Don B. DeYoung, 172 R
Creationist Movement in Modern America/The . . ., R. Brown, 117 R
Creationists in a Secular World/God's Own Scientists: Jerry Bergman, 115 R
Cretaceous/Creation and the. . ., Tas Walker, 131 L
Cretaceous Epeiric Sea or Floodwater? (A Reply to Garner, Robinson, Garton, and Tyler)/Late . . ., Carl R. Froede, Jr., 234 L
Critics/Creation Scientists Answer Their . . ., Emmett L. Williams, 60 R

D

Darwinism: Science or Philosophy? Jerry Bergman, 240 R
Darwinism: Science or Philosophy? Wayne Frair, 17 R
Davidheiser, Bolton
  Another Embarrassing "Early Man," 132 L
Davidson, Gordon E.
  Are There 800 Billion Vertebrate Fossils Buried in the Karoo? (A Response to Bill Yake), 201 L
Dendrochronology and Biblical History, Harald Heinze, 81 L
DeYoung, Don B.
  Biblical Creationism, 16 R
  Creationism in Twentieth Century America, 172 R
  Dedication to David Boylan, 5 D
  Dedication to John Klotz, 189 D
  I Studied Inscriptions from before the Flood, 227 R
  Lonely Hearts of the Cosmos, 46 R
  The Kuznetsov Controversy, 10 L
  Why I Believe in Creation, 106 R
  Wrinkles in Time, 17 R
Diatoms to Dinosaurs: The Size and Scale of Living Things, Carl R. Froede, Jr., 16 R
Dinosaurs: A Response to Garner, Robinson, Garton, and Tyler/Polar . . ., Michael J. Oard, 237 L
Dinosaurs and The Genesis Flood by M. J. Oard, 1995, *CRSQ* 32:47-57/Comments on Polar . . ., Carl R. Froede. Jr., 231 L
Dinosaurs and The Genesis Flood/Comment on Polar Paul Garner, Steven Robinson, Michael Garton, and David Tyler, 232 L
Dinosaur Bone by Opal in Big Bend National Park, Brewster County, Texas/Surficial Replacement of . . ., Carl R. Froede, Jr., 11 L

E

Editor's Comments, Eugene F. Chaffin and George F. Howe, 6, 67, 125, and 189 D
Erosion at Providence Canyon, Georgia/Rapid, Emmett L. Williams CP-June
Evangelical Engagement with Science/The . . ., John Goertzen, 182 R
Extinction: Bad Genes or Bad Luck, Jerry Bergman, 189 R

---

*George F. Howe, Ph.D., 24635 Apple Street, Santa Clarita, CA 91321-2614. Thanks are expressed to Phyllis Hughes for help in preparing this index.

F

Faulkner, Danny R.
  Creation and Time: A Biblical and Scientific Perspective on the Creation-Date Controversy, 43 R
Flood Based on Unknowns: A Reply to Mr. Yake/Criticisms of The Universal . . ., William Waisgerber, 21 L
Flood Waters, A Reply Mr. Yake/Where Are The . . ., Carl R. Froede Jr., 22 L
Flood/Objections from Science to Global . . ., Bill Yake, 12 L
Floods That Carved The West/The . . ., Robert E. Gentet, 242 R
Fox Catches Fox Snake, Jerry Whitesell, CP-December
Fox/The Omnivorous Red . . ., John R. Meyer and Glen W. Wolfrom, 157 D
Frair, Wayne
  Creation: Facts of Life, 61 R
  Darwinism: Science or Philosophy? 17 R
Froede, Carl R., Jr.
  Comments on the Polar Dinosaurs and the Genesis Flood by M. J. Oard, 1995, *CRSQ* 32:470-57, 231 L
  Grand Canyon: Monument to The Flood, 155 R
  Greenhouse Conditions in Antediluvian Times? 79 L
  Late Cretaceous Epeiric Sea or Floodwater? (A Reply to Garner, Robinson, Garton, and Tyler), 234 L
  Noah to Abram: The Turbulent Years, 242 R
  Some Initial Thoughts Regarding Catastrophic Plate Tectonics, 130 D
  Surficial Replacement of Dinosaur Bone by Opal in Big Bend National Park, Brewster County, Texas, 10 L
  The Karroo and Other Fossil Graveyards: A Further Reply to Mr. Yake, 199 L
  Where Are the Flood Waters? A Reply to Mr. Yake, 22 L
  Why Sediments Are on Continents: An Answer to Mr. Yake, 229 L
  Would the Global Flood Have Created a Big Mud Bowl? A Further Reply to Mr. Yake, 171L
  Would the Oceans Have Boiled in a Global Flood? A Further Answer to Mr. Yake, 70 L

G

Garner, Paul
  Comment on Polar Dinosaurs and the Genesis Flood, 232 L
Genetic Engineering: Dreams and Nightmares, Eugene F. Chaffin, 227 R
Gentet, Robert E.
  The Floods That Carved the West, 242 R
Golem: What Everyone Should Know about Science/The . . ., Eugene F. Chaffin, 156 R
Goertzen, John
  The Evangelical Engagement with Science, 182 R
Grand Canyon: Monument to the Flood, Carl R. Froede, Jr., 155 R
Greenhouse Conditions in Antediluvian Times? Carl R. Froede, Jr., 79 L

H

Heinze, Harald
  Dendrochronology and Biblical History, 81 L
History of Life/The . . ., Lane P. Lester, after 214 D
Hoff, Phil
  Heat Output from Volcanoes-An Answer to Yake, 199 L
Horned Toad Lizard, George F. Howe, back CP-March
Howe, George F.
  Editor's Comments, 6, 67, 125, and 189 D
  Horned Toad Lizard, back CP-March
  Index to Volume 31/of *CRSQ*, 58 D
  Leaf Lenses of Oxalis, 70 D
  Seed Sprouting Research and the Global Flood, 23 L
Humphreys, D. Russell
  Response to Reed, Bennett, Froede, and Oard, 197 L

I

Ice Sheet and Early Vikings in Mid-America/The Great Clifford L. Lillo, 45 R
Index to Volume 31 of *CRSQ*, George F. Howe, 58 D
Inscriptions from before the Flood/I Studied . . ., Don B. DeYoung, 227 R

K

Kaplan, John
  The Soul of Science: Christian Faith and Natural Philosophy, 239 R
Karoo? (A Response to Bill Yake)/Are There 800 Billion Vertebrate Fossils Buried in the . . ., Gordon F. Davidson, 201 L
Karroo and Other Fossil Graveyards: A Further Reply to Mr. Yake/The . . ., Carl R. Froede, Jr., 199 L
Kaufmann, David A.
  Minutes of 1995 Creation Research Society Board of Directors Meeting, 97 D
Keithley, Willis E.
  Leaf Lenses of Oxalis, CP-September
Keyword Index to Volume 31, Glen W. Wolfrom, 95 D
Klotz/Dedication to John . . ., Don B. DeYoung, 189 D
Know What We Know?/How Do We. . ., Lane Lester, after 92 D
Kouznetsov Controversy/The . . ., Don B. DeYoung, 10 L

L

Lab Director's Reports, John Meyer, 28, 98, 155, and 215 D
Landslide Blocks Virgin River at Zion National Park, Emmett L. Williams, 197 L
Leaf Lenses of Oxalis, George F. Howe, 70 D
Leaf Lenses of Oxalis, Willis E. Keithley, CP-September
Lester, Lane P.
  How Do We Know What We Know (Copy 'n' Share), after 92 D
  Reply to Bergman, 88 L
  The History of Life (Copy 'n' Share), after 214 D
Lillo, Clifford L.
  Voyage of the Planets, 24 R
  The Great Ice Sheet and Early Vikings in Mid-America, 45 R
Man"/Another Embarrassing "Early . . ., Bolton Davidheiser, 132 L
Meyer, John N.
  Resources for Research and Publication, 28 D
  Resources for Research and Publication, 98 D

  Taking Stock, 215 D
  The Omnivorous Red Fox, 157 D
  Unique Way of Giving, 155 D
Minutes of 1995 Creation Research Society Board of Director's Meeting, David A. Kaufmann, 97 D
Mud Bowl? A Further Reply to Mr. Yake/Would the Global Flood Have Created a Big . . ., Carl R. Froede. Jr., 171 L
Mutations?/Beneficial . . ., Jerry Bergman, 88 L

N

Noah to Abram: The Turbulent Years, Carl R. Froede, Jr., 242 R

O

Oard, Michael J.
  Plant Survival, Floating Debris, and Soil: An Answer to Yake, 22 L
  Polar Dinosaurs: A Response to Garner, Robinson, Garton, and Tyler, 237 L
  Some Initial Thoughts Regarding Catastrophic Plate Tectonics, 130 L
Oceans Have Boiled in a Global Flood? A Further Answer to Mr. Yake/Would the . . ., Carl R. Froede, Jr., 70 L

P

Philosophy/The Soul of Science: Christian Faith and Natural . . ., John Kaplan, 239 R
Planets/Voyage of the . . ., Clifford L. Lillo, 24 R
Plant Survival, Floating Debris and Soil: An Answer to Yake, Michael J. Oard, 21 L
Plate Tectonics/Some Initial Thoughts Regarding Catastrophic . . ., John K. Reed, Chris R. Bennett, Carl Froede, Jr., and Michael J. Oard, 130 L
President's Remarks, Emmett L. Williams, 156 D
Porter, R. M.
  Correlating Tree Rings. 170 L

R

Reed, Bennett, Froede, and Oard/Response to . . ., Steven A. Austin, John R. Baumgardner, D. Russell Humphreys, Andrew Snelling, Larry Vardiman, and Kurt Wise, 197L
Reed, John K.
  Not a Chance-The Myth of Chance in Modern Science and Cosmology, 118 R
  Some Initial Thoughts Regarding Catastrophic Plate Tectonics, 130 R
Rusch, Sr./In Memoriam: Wilbert . . ., Emmett L. Williams, 78 D
Robinson, Steven
  Comment on Polar Dinosaurs and the Genesis Flood, 232 L

S

Scoggan, Bruce
  Cadborosaurus- Survivor from the Deep, 243 R
Sediments Are on Continents: An Answer to Mr. Yake/Why . . ., Carl R. Froede, Jr., 229 L
Seed Sprouting Research and the Global Flood, George F. Howe, 23 L
Sievertsen, Walt
  Assessment of World Views: Creation, Progressive Creation, and Theistic Evolution, 196 L
Silica in Living Organisms, Emmett L. Williams, 11 L
Snelling, Andrew
  Response to Reed, Bennett, Froede, and Oard, 197 L

T

Taylor, Bruce J.
  Could the Bristlecone Pine Have Survived a Catastrophic Flood? 80 L
Theology: An Introduction to New Testament Doctrine/Systematic . . ., Jerry Bergman, 78 R
Thornhill, Dennis
  Wood Rat Nests Benefit Paleobotany, CP-March
Time: A Biblical and Scientific Perspective on the Creation-Date Controversy/Creation and . . ., Danny R. Faulkner, 43 R
Time/Starlight and . . ., Emmett L. Williams, 45 R
Time/Wrinkles in . . ., Don B. DeYoung, 17 R
Tree Rings/Correlating . . ., R. M. Porter, 170 L
Tyler, David
  Comment on Polar Dinosaurs and the Genesis Flood, 232 L

V

Vardiman, Larry
  Response to Reed, Bennett, Froede, and Oard, 197 L
Varves and the Flood: A Reply to Mr. Yake, John Woodmorappe, 230 L
Varves Form in a Global Flood?/How Did the Green River . . ., Bill Yake, 230 L
Volcanoes-An Answer to Yake/Heat Output from . . ., Phil Hoff, 199 L

W

Waisgerber, William
  Criticisms of the Universal Flood Based on Unknowns: A Reply to Mr. Yake, 21 L
  The Puzzle of a Persistent Ammonite, 88 L
  Unknowns: A Reply to Mr. Yake, 21 L
Walker, Tas
  Creation and the Cretaceous, 131 L
Whitesell, Jerry
  Fox Catches Fox Snake-CP-December
Williams, Emmett L.
  Creation Scientists Answer Their Critics, 60 R
  In Memoriam: Wilbert Rusch, Sr., 78 D
  Landslide Blocks Virgin River at Zion National Park, 197 L
  Silica in Living Organisms, 11 L
  Starlight and Time, 45 R
Wise, Kurt
  Response to Reed, Bennett, Froede, and Oard, 197 L
Wolfrom, Glen W.
  Keyword Index to Volume 31, 95 D
  The Omnivorous Red Fox, 157 D
Woodmorappe, John
  Varves and The Flood: A Reply to Mr. Yake, 230 L
Wood Rat Nests Benefit Paleobotany, Dennis Thornhill, CP-March

Y

Yake, Bill
  How Did the Green River Varves Form in a Global Flood? 230 L
  Objections from Science to Global Flood, 12 L

LETTERS TO THE EDITOR

Life on Other Planets

May I add some comments to Jerry Bergman's article "The acceptance of evolution and a belief in life on other planets" *(CRSQ* 32:71-77)?

From a Christian viewpoint, we may assume that any extra terrestrial life forms that may exist have been created by God. Very readable explorations of the implications of this were written by C. S. Lewis (1952, 1953), which also provide food for thought on the nature of intelligence and the possibility of resurrection existence for terrestrial animal life. (There are similarities in the position of terrestrial non-human species and putative extra-terrestrials.)

An equally readable exploration of an alternative to this assumption was written by the (agnostic) James Blish (1958), who was assured by theologians that the Roman Catholic Church at that time had a theological position on the "plurality of worlds" and any inhabitants, of which he gives a summary in the introduction:

> . . . each of such planets (solar or non-solar) must fall into one of three categories:
> (a) Inhabited by sentient creatures, but without souls; so to be treated with compassion but extra-evangelically.
> (b) Inhabited by sentient creatures with fallen souls, through an original but not inevitable ancestral sin; so to be evangelized with urgent missionary charity.
> (c) Inhabited by sentient soul-endowed creatures that have not fallen, who therefore
> (1) inhabit an unfallen, sinless paradisal world;
> (2) who therefore we must contact not to propagandize, but in order that we may learn from them the conditions (about which we can only speculate) of creatures living in perpetual grace, endowed with all the virtues in perfection, and both immortal and in complete happiness for always possessed of and with the knowledge of God.

This seems a comprehensive summary, although the action to be taken in category (b) is perhaps suspect; it is difficult to see how the redemptive act of the Son of MAN can be applied to the children of an alien race.

While interest in UFO's has perhaps never been as widespread as today, there seems to be no lack of earlier accounts, from classical times to the middle ages (Thiel, 1959; Weldon, 1975). Thiel notes that in the middle ages "devils" had been seen in the air, which were considered to have come from Mars, while Weldon mentions UFO descriptions in ancient Hindu, Tibetan, Egyptian, and Roman writings, with later sightings covering all periods up to the present. Apparently the thirteenth century was a "vintage period or UFO's in England."

In pre-Wright brothers times the UFO's were normally ascribed as being demonic. In medieval times it was reported that demonic visitors sometimes had sexual relations with humans *(incubi* and *succubi);* there is a parallel between this and present day reports of claimed "flying saucer" abductees that they were subjected to sexual interference by the "aliens." This strikes a chord from Genesis 6:1-7 where the "sons of God" married the "daughters of men," considered by many to be congress between (demonic) angels and humans, an interpretation strenuously argued by Pember (1942) amongst others.

If even some of present "UFO" activity is demonic, then the public acceptance of the probability of life on other worlds is of even greater significance than a Satanic ploy to discredit Scripture by overthrowing belief in its foundational book of Genesis. It could be a device to allow mankind to "rationally" accept communications and instructions from demons without raising alarm as to their source. This would fit well in many Christian end-time scenarios, and is a state of affairs that would harmonize with the current converging beliefs of most alternative religions.

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Alan Donnelly
3 Old Croxton Road
Thetford
Norfolk lP24 1AF
England

Christmas Greetings from the Founder

During the Christmas season 1995, the Board of Directors received a card from Dr. Walter E. Lammerts, the founder of the Society, the first president and Quarterly editor of the Society. Dr. Lammerts resides in Lodi, California. He related to us that he enjoys reading the Quarterly and he is pleased that the Society is on the Internet. He feels that we are making good progress.

God has blessed the Society by providing such men as Dr. Lammerts to chart our course in the early days. Dr. Lammerts was active into the 1980's, still writing for the Quarterly, and was instrumental in choosing the Chino Valley site for the Research Center.

The Society has a rich heritage to uphold and we cherish the kind remarks of our Founder.

Emmett L. Williams
5093 Williamsport Drive
Norcross, GA 30092

QUOTE: "Who's on First?"

Library shelves are groaning with rival paleontologists doing an evolutionary version of Abbott and Costello's famous "Who's on First?" routine that might be called "Who Came First?" The crux of the debate is where on the human family tree certain fossils discovered during the past two decades fit. The bickering between rival camps has not been pretty.

Davis, Kenneth C. 1992. Don't Know Much About Geography. Avon Books. New York. p. 197.

Comment on “Proposal for a Creationist Geological Timescale” *CRSQ* 32:90-99

I found Carl Froede’s “Proposal for a creationist geological timescale” (1995) exciting because the concept is exactly the same as that behind the Biblical model I presented at Pittsburgh (Walker, 1994) which is illustrated in Figure 1. The detailed appearance of the two models is remarkably similar which attests to the clarity of the Scriptural account.

Geological inquiry requires a knowledge of earth history. Evolutionists first assume a history so they can develop their geological models. As Bible believers it makes sense to start instead with the earth history recorded in Bible. Our models will be very different from the evolutionary ones.

Both Biblical models have identified the significant geological divisions as the Creation and Flood events together with the Lost-World and New-World eras. This indicates that the Biblical history is quite lucid as far as its geological impact is concerned. Froede includes the “Ice Age” as a high level category on his ‘timeframe.’ Since the Ice Age is not directly described in the Bible and is not a world wide feature I would prefer to demote the ice age to a lower category of classification. The Residual phase of the Pittsburgh model would accommodate this feature. As Froede says, it is important not to introduce “any preconceived ideas.”

It is worth noting that with the Biblical models there is a non-uniform relationship between the volume of rocks deposited and time. This is contrary to the concept of uniformitarianism. On the Pittsburgh model the idea of non-uniform relationship is conveyed by means of two scales; a time-scale and a rock-scale. The definitive relationship between these two scales will only be determined after the rocks of the world have been classified within the model, which will involve an iterative approach.

Below his primary classification Froede’s model is not developed beyond “Upper,” “Middle” and “Lower.” These are not particularly helpful categories for classification purposes. However, it is possible to divide the Biblical model further. Both the Creation and Flood events can be divided into two; the Creation event by the day three regression and the Flood event by the waters rising and the waters falling. Such a division is Scriptural and provides additional process-effect clues by which classification can be achieved. A further level of classification, the “phase,” has been included in the Pittsburgh model which is equivalent to the “group” in Froede’s model. The idea is for each phase to be process dependent. However the relationship of the phase with the Bible is a little more distant and the process-effect connection less precise than the higher level categories. It is at the level of the phase the model can be “dynamic and flexible” as classification work progresses.

With an integrated geological model of world history, we are now in a position to develop distinctive classification criteria based on the process-effect concepts associated with each phase. I do not believe this will be possible without exploring a number of metaphysical considerations. Some preliminary proposals have been suggested (Walker. 1994).

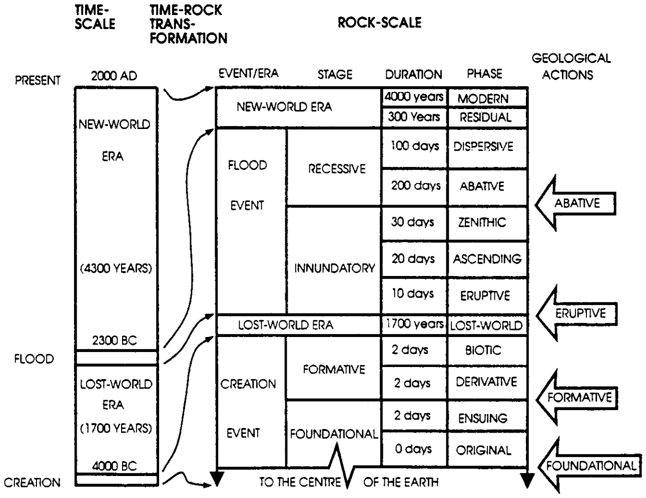

Figure 1. The Pittsburgh Biblical geological model (After Walker, 1994).

Once criteria have been developed, the geology of an area can be classified in terms of the Biblical model. Initially this can be done utilizing available geological data such as maps, field guides, and geological reports. Because there is such an abundance of data available today, preliminary conclusions can be reached without the need for field work. However this data is presented in evolutionary terms so the field information may have been wrongly interpreted, particularly depositional environments. We will need to recognize discordant information, find out the basis for the interpretation and then check the facts in the field.

The distinguishing feature of these models is that they start with the Bible. The process of classification leads to geological research which is Bible driven. I believe that investigations based on Biblical geological models will provide new understandings and insights into the geology of the earth. “The unfolding of your words gives light; it gives understanding to the simple.” (Psalm 119:130).

Yours in the name of Jesus Christ our Creator and Saviour,

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Tas Walker
34 Fawkner St.
Chapel Hill,
Queensland,
Australia 4069

Catastrophic Shoreline Changes

Ancient cities such as Ur (Iraq), Tartessos/Tarshish (Spain), and Tiahuanaco (Bolivia) are not the only sites to be drastically affected by hydrological changes, as aptly illustrated by Carl Froede’s article in the December 1995 *CRSQ*, “Dauphin Island, Alabama: Evidence for rapid erosion.” Froede suggests that the “tens of thousands of years” of relative island stasis is a faulty uniformitarian assumption, based on the physical processes seen shaping the island today. Supporting data can be found at an adjacent and similar site approximately 47 miles to the east, at the pass to the harbor of Pensacola, Florida (Figure 1).

Fort McRee, part of the United States coastal defense fortifications program before the Civil War, was constructed on the eastern terminus of Perdido Key, at the western side of the entrance to Pensacola Bay, in the late 1830's. Unfortunately, it was a victim of the same erosional forces that Froede discusses in regard to Dauphin Island, Alabama, and the fort no longer exists intact above water (Coleman, 1988). From 1856 to 1931 there was a westward migration of Perdido Key of 413 feet; but from 1931 to 1981 this recession was reversed and Perdido Key moved back to the east a total distance of about 350 feet (Coleman, 1988, pp. 51-58, 75-94; Stone, 1984, p. 34). The western tip of Santa Rosa Island has undergone similar drastic changes. Fort Pickens, another coastal defense fort, once dominated the shoreline on the western tip of Santa Rosa Island but is now a sizable distance from the water.

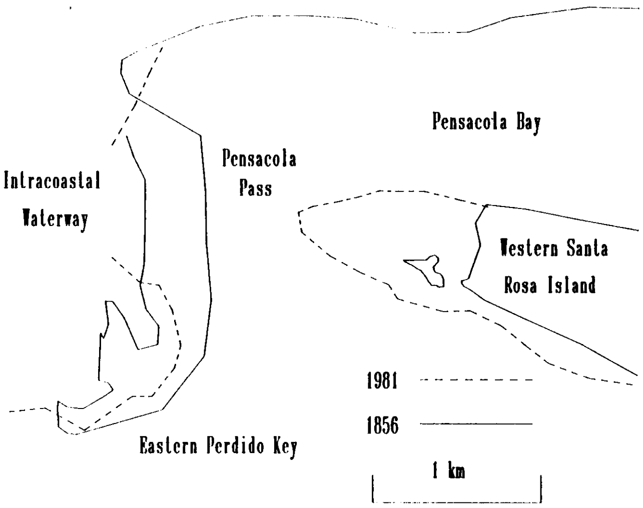

Figure 1. Shoreline changes near Pensacola, Florida. Based on a figure from Stone (1984), reprinted in Coleman (1988).

These drastic changes have all occurred in the recent past, and with continuing catastrophic changes such as periodic hurricanes, such coastal areas will remain in dynamic transition. The two 1995 hurricanes (Erin and Opal) which struck the Pensacola area did enormous erosional damage to Santa Rosa Island (and its communities of Navarre Beach and Pensacola Beach). The aftermath of these 1995 storms provides yet more examples of how quickly landscapes can change in the face of rapid tidal and wind forces. Both the examples of Fort McRee and recent hurricane damage offer evidence of the catastrophist's (young earth Creation/Flood) model, rather than the uniformitarian model.

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Brian R. Rucker
P.O. Box 284
Bagdad, FL 32530

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